

MONEY

FOR ALL

THE UNDERGROUND PLAYBOOK

FOR HOW DECENTRALISED FINANCE (DEFI) AND
THE BLOCKCHAIN WILL SAVE THE WORLD AND
MAKE EVERYONE PROSPEROUS



DAVID CAMERON GIKANDI

Money For All

The Underground Playbook for How Decentralized Finance (DeFi)
and the Blockchain Will Save The World and Make Everyone
Prosperous

David Cameron Gikandi

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*To my parents and three brothers, without whom, I wouldn't be here
writing this for you.*

Foreword by William Gikandi

Creative destruction is a concept that describes the dynamic effects of innovation. Whenever a significant technology emerges, a series of changes follows in its wake, some predictable and others completely left of field that are nonetheless felt strongly.

Austrian economist Joseph Schumpeter popularized it as a theory of economic innovation and the business cycle.

Every significant technology revolutionizes the economic structure from within, in cycles that destroy old ways of doing things while making space for the new.

Fire provided a source of warmth and lighting, protection from predators (especially at night), a way to create more advanced hunting tools, and a method for cooking food. These cultural advances allowed human geographic dispersal, cultural innovations, and changes to diet and behavior.

Farming meant that people did not need to travel to find food. Instead, they began to live in settled communities, and grew crops or raised animals on nearby land. They built stronger, more permanent homes and surrounded their settlements with walls to protect themselves

"Schumpeter's gale" has followed every human innovation since then culminating in the Information Age. Where the internet has transformed every aspect of our lives, from how we work, play, connect and socialize. Future generations will look back and see us as the early pioneers of this age that would cause massive shifts in society.

One of these shifts is Money. A simple concept that started with shells and pebbles and has evolved to dollars, cents and fractional reserve lending. As Bernard Lietaer and Stephen Belgin say in their book, "Our current monetary paradigm occurred at a time when the medical treatment of choice for the prevention and treatment of illness and disease was bloodletting."

Money and our very idea of it may feel unchangeable and unassailable.

However, we can already see how the information age has started to chip away (destroy) certain parts of it and create new parts of it, slowly transforming it over time.

For example, the physical form of money has started to disappear with the introduction of credit cards. In some countries, transactions over a certain amount cannot be done with cash. At the same time, money has become infinitely faster, with micro-transactions enabling trades and exchanges of value at dizzying speeds.

More importantly, the concept of decentralized money has started to enter the zeitgeist. The idea of money not controlled by a state was considered blasphemy 20 years ago whereas today, a teenager could spin up their own cryptocurrency in minutes.

Bitcoin was just the first volley in a series of waves that will change how we think about and use money.

Those of us who wish to stay ahead of the game and anticipate in the coming changes need to read David's book. David first lays the foundation for us by showing us the intricacies of our current financial system. He highlights the work of many authors and thinkers and those references and snapshots in themselves offer valuable pointers for us who wish to dig deeper into this world of economics. The thinkers referenced are the interesting, illuminating ones, not ones by dry pontificators who never saw Bitcoin coming.

David layers more knowledge above this foundation, describing the different aspects of Decentralized Finance, the blockchains that DeFi applications run on, and more importantly, the "WHY of DeFi" and the impact it will have.

David is a great business coach and a master when it comes to predicting future trends. I have worked in genetics, led departments in engineering and InfoTech. I credit a large part of my success to him and consult with him on a regular basis especially on trends. He is most known for his book "A Happy Pocketful of Money", and I expect this work to have just as much impact.

Knowledge confers power to those who seek wisdom. Knowledge helps us to see the future and prepare for it. David's book is an illuminating insight and reference into the upcoming world of Decentralized Finance.

Will Gikandi
FinTech CTO & Blockchain Investor

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Part I: The Clear & Present Danger We Face

Let There Be Light!

“The Times 03/Jan/2009 Chancellor on brink of second bailout for banks.”¹

This statement was written into the genesis block, block 0 of the Bitcoin blockchain.

By the mysterious, anonymous [Satoshi Nakamoto](#)². It's inventor. Creating a permanent, uncensorable message on the Bitcoin blockchain.

And with that, a new era in human history began.

Bitcoin was invented just after the Global Financial Crisis of 2008. Designed to give people sovereign control over their own money.

Since then, Bitcoin has made many allies and enemies.

It has died more than 429 times.³

Each time, rising again. And again.

Each time, bringing us closer and closer to... closer to what?

¹ Bitcoin Genesis Block Newspaper - The Times 03 Jan 2009.

<https://www.thetimes03jan2009.com/>

² https://en.wikipedia.org/wiki/Satoshi_Nakamoto

³ <https://99bitcoins.com/bitcoin-obituaries/>

David And Goliath

“Giants are not what we think they are. The same qualities that appear to give them strength are often the sources of great weakness.”

- Malcolm Gladwell, “[David and Goliath](#)”

“No complaint is more common than that of a scarcity of money.”

- Gwendolyn Hallsmith, Bernard Lietaer, “[Creating Wealth](#)”

Bitcoin is an uncensorable, unstoppable, globally accepted currency.
Without a government.
Without a bank.
Let that sink in as deep as you can.

The End of Money & Society As We Know It (Whether We Like It Or Not)

A World on The Brink of Utter Transformation

Something new is coming. Just as farming societies differed in kind from hunting and gathering bands, and industrial societies differed radically from feudal or yeoman agricultural systems, so the New World to come will mark a radical departure from anything seen before.

*- James Dale Davidson, Lord William Rees-Mogg,
“[The Sovereign Individual](#)”*

Our world is on the brink of utter transformation.

Environmentally, politically, socially, biologically, spiritually, conceptually, technologically, and financially.

In the past, emperors, queens, kings, and cabals drove societal change.

For the first time in history, individuals now have the power to drive change.

One of these powers is decentralized finance (DeFi).

It appears that once again, the technological genie has been unleashed from its bottle. Summoned by an unknown person or persons with unclear motives, at an uncertain time in history, the genie is now at our service for another kick at the can - to transform the economic

power grid and the old order of human affairs for the better. If we will it.

- Don Tapscott, Alex Tapscott, "[Blockchain Revolution](#)"

But with great power comes great responsibility. For we are faced with the single biggest threat humanity has ever faced.

Global climate change.

Which we must urgently and collectively address to avoid societal collapse and the destruction of humanity.

We have a choice.

Paradise Or Oblivion? (The Big Question of Our Era)

Utopia or dystopia. Paradise or oblivion. That is the choice facing our world today.

You may not know it yet, but DeFi is one of the most powerful tools to become available to humankind in a very, very long time. Real power in the hands of everyday people. It has the power to transform our world in unimaginable ways. For good or for worse.

What will we choose to do with this power?

Will we choose to save our world from total ruin, or doom it?

With DeFi, as you will see here later, we really do have the power, finally, to create monetary systems that don't force us to destroy the earth.

Do keep that in mind as you discover the amazing world of DeFi.

But First, Let's Clear Our Mind of The Centuries of
Brainwashing That Says *"This Is How Things Work, This
Is the Only Way"*

We must clear our minds from the centuries of brainwashing that might prevent us from fully realizing the power and potential of DeFi.

Please don't skip ahead. Don't jump straight to the DeFi sections.

This foundational stuff is extremely important in empowering you to think both inside and outside the box. Otherwise, you might get trapped, with one foot in the old world and one in the new world. Trying to pour new wine into old wineskins.

"Every day of your life, you move through systems of power that other people made. Do you sense them? Do you understand power? Do you realize why it matters? If you aren't taking action, you are being acted upon."

- Eric Liu, "[How to Understand Power \(A TedEd Talk\)](#)"⁴

To clear our minds, we begin at the beginning.

What is money, beyond what you may have been led to believe?

⁴ https://www.youtube.com/watch?v=c_Eutci7ack

What, REALLY, Is Money?

Don't think "money". Think MoE, UoA, SoV.

To really understand decentralized finance (DeFi), we begin by understanding money afresh.

To do so, don't think "money".

Think MoE, UoA, SoV.

Like this:

MoE = Medium of Exchange. Money exists first and foremost as a tool that solves the "*Coincidence of Wants*" problem. In other words, if I want what you have, and you want what I have, and we both want it at the same time, in the same quantity, in the same location, then we have achieved coincidence of wants.

Unfortunately, that rarely happens. And that's usually because of timing, location, and quantity differences and constraints. That's why barter trade doesn't usually work. Barter suffers from the problem of the "coincidence of wants". And therefore, for exchange to value, to exchange things, we need a medium of exchange (MoE).

An MoE is an intermediary instrument. I might desire what you have, and you might desire what I have, but at different times, locations, and unequal quantities. So, then we go through a middle thing, an MoE, usually pieces of paper with numbers, or coins, so we can trade. The middle thing, the money, is not really what we wanted. But it helps us get what we really wanted. That's the first and primary function of this thing we call 'money'. An intermediary, used to facilitate a trade, and to avoid the inconveniences of the lack of a coincidence of wants.

Now, realize that we are accustomed to having bank currencies as the only medium of exchange that we use. But there are many other instruments that can be used as MoEs. Anything suitable can be used as an MoE. It doesn't have to be bank money.

UoA = Unit of Account. The second main function of money. A UoA is anything suitable that allows us to (1) value transactions and compare

different goods and services using one common standard of value (2) keep accounts in a ledger of transactions and (3) make calculations, either on the ledger or the value of the goods and services themselves.

SoV = Store of Value. The final main function of money. An SoV is anything suitable that can hold value, be saved, retrieved, and exchanged later. It must be predictively useful when retrieved, it must retain that purchasing power. It shouldn't lose much value over time (even better, it should gain value over time). It shouldn't be easily counterfeited or overproduced such that its supply gets inflated. And it shouldn't get destroyed easily. An SoV stores the value gained in an exchange, so you can use it later. The best examples of an SoV are gold and land. But many other things can function as an SoV.

Simply break down the word money into his constituents, MoE UoA SoV, and that begins to free your mind.

That's the first step in truly understanding decentralized finance.

Now, besides having the functions of MoE, UoA and SoV, currency and money must also have these four properties:

Portable: easy to carry.

Durable: last a long time, even with repeated use, without being destroyed.

Divisible: you can break down a big unit into smaller units easily (e.g., break \$100 into one hundred \$1 bills)

Fungible: absolutely interchangeable, which means \$1 in my pocket is the same as \$1 in your pocket.

The more you make money or currency to be portable, durable, divisible, and fungible, the better and more publicly useful and acceptable it will be.

Now, here's a point:

If you can establish the attributes of MoE, UoA and SoV on ANY instrument, and people agree to use it, you have created MONEY.

If you can establish the attributes of MoE and UoA (without the SoV) on ANY instrument, and people agree to use it, you have created CURRENCY.

Currency = Money - SoV. The US dollar, the Kenya shilling, the British Pound, the Peso, the RMB/Yuan, the Yen, the Euro... all these are currencies, not money. They lose value daily, they lose their purchasing power, which is what we experience as 'inflation' (things getting more expensive over time). Most people have never actually used money in their lives, they have only used currencies. Strictly speaking, gold is money, dollar is currency. However, to make it easier to read this book, I will usually use the word money to mean both money and currency.

So that's money.

MoE, UoA, SoV.

It is that simple.

There really isn't any magic or mystery to it.

Next... An Insider Look at Monetary Systems, Banks & Banking (And Their Achilles Heel)

We have looked at what money is.

But to really do DeFi properly, it pays to really “get out of the box” and look at monetary systems afresh. Because money is manufactured using monetary systems.

Don't assume the current monetary system is the only one possible.

It isn't.

But we have been born into it and lived inside it all our lives, and we don't even realize there are alternatives. Therefore, without understanding monetary systems, we will tend to build DeFi systems that work within the current monetary system. One foot in the old world, one foot in the new world.

However, the real opportunity with DeFi lies not just within the current system, but even more so outside of it.

And with that in mind, let's start with Bill Gates...

"Banks are dinosaurs... we can bypass them."

- Bill Gates, 1994

"Banking is necessary, but banks are not. We need banking. We don't need banks anymore."

- Bill Gates, 1997

Now why would Bill Gates say such an alarming thing?

Let's see. We start by looking at monetary systems.

Whenever someone creates a monetary system, they must decide two things: the **SOMEONE** and the **SOMETHING**. This is unavoidable.

The **Someone** = Who owns the monetary system?

The **Something** = What is this monetary system based on?

Those two questions must be answered. These are the fundamentals of any monetary system.

And depending on what you choose, you end up with a very different economic system, culture, and society. Because monetary systems have massive effects on the populations that they operate in.

The available choices are as follows.

The **Someone** that owns a monetary system can either be:

1. The **public**. The collective population, not the government. Meaning, everyone in the population owns a share. Today, no population of any nation owns their monetary system.
2. The **government**. E.g., the US government's Greenback currency in the 1860s. Today, almost no government owns their monetary system. They own the treasury and the mint, but not the monetary system. Today, our monetary systems are mostly owned by private banks, worldwide. Central banks simply regulate the private banks, but they don't own them. Central banks mint a few coins and paper notes, less than 4% of money supply. The bulk of money supply is [created out of thin air by private banks](#) using a debit-credit system of debt.⁵
3. **Privately owned**. E.g., banks, monarchies, and companies. This is the option we have today, worldwide.
4. **Decentralized and autonomous**, which means nobody really owns it. Like the internet, Bitcoin or the ocean or sky. Nobody owns the internet, the bitcoin network, the ocean, or sky.

The **Something** that a monetary system is based on can either be:

1. **Asset-based**. Means, the currency is backed by an asset, like gold. Also known as “reserve” banking. You can have full reserve (every note is fully backed by an equivalent value of asset), or fractional reserve (every note is only partially backed by assets). In the old days, for a time, money was asset-based, which means it was backed by gold. You could take your paper note, walk into a bank, put it on the desk, and they'll give you an equivalent sum of gold. But you cannot do that now (because [today's money isn't backed by any gold at all](#), none, contrary to popular belief).⁶ There is no gold backing your money. None. Zero. Period. That ended when President Nixon took us all off the gold standard in 1971⁷.

⁵ <https://www.youtube.com/watch?v=iFDe5kUUyT0>

⁶ <https://www.youtube.com/watch?v=DyV0OfU3-FU>

⁷ https://en.wikipedia.org/wiki/Nixon_shock

2. **Debt-based.** Whereby the currency is literally founded on debt. Every new dollar is literally created out of debt, backed by debt. Debt instead of assets. [This is what we have today, worldwide](#). It creates fiat currency (the opposite of reserve currency). Fiat money does not have intrinsic value (it is just a piece of paper or digital record, with nothing backing it, except being legally enforced by government through legal tender legislation).⁸
3. **Productivity-based.** Proof of work. You produce something, or you do a service, and a receipt is created out of thin air for you. You get that receipt, and that receipt is currency, you can trade with it. The receipt did not exist before you did the work, made the products, provided the services. This is not the same as earning a wage, a salary. You are not working for money. Instead, money is being created out of thin air, to recognize your output. When you work for money, you earn an income, paid from a pre-existing amount of cash. With productivity-base systems, when you work, new money is created, it does not pre-exist before the work happens. So literally, you do not have to first have money to make things happen. This is very liberating. It eliminates the false scarcity that debt-based and asset-based money creates, because it creates money that is always sufficient and equivalent to the work/output of a person or society. We will talk more about this later when we discuss complimentary currencies, plus the inflation and artificial scarcity created by our current monetary system.

Question:

What is the **best** combination of Someone and Something?

I suggest to you that the best combination is:

Decentralized & Autonomous + Productivity-Based

⁸ <https://www.reuters.com/business/global-debt-is-fast-approaching-record-300-trillion-iif-2021-09-14/>

Because it creates equal opportunity, equal access, efficiency, and transparency. And this is the hidden power of DeFi.

And what is the **worst** combination of Someone and Something?

Privately-owned + Debt-based

That is the worst. By far!
And that is what we have today.
I'm not the only one who thinks so. See:

“Of all the many ways of organising banking, the worst is the one we have today. Change is, I believe, inevitable. The question is only whether we can think our way through to a better outcome before the next generation is damaged by a future and bigger crisis.”

*- Sir Mervyn King, Governor of the Bank of England
2003 - 2013*

Most of the money in the world is not just stored in private banks; it is created by private banks. For nearly a hundred years, some of the smartest economists in every generation have said this is a horrible way to do money.

- Jacob Goldstein, “[Money](#)”

Sure, it is arguably better than barter trade. But the problem with it is that private entities (a small group of elites) own and control the system that everybody else must use. The problem with this is that it creates an elite vs non-elite society, the haves and the have-nots, and that gap keeps getting bigger and bigger.

It also creates secrecy and cabalistic control. Cabal means a secret political clique or faction. Unelected people running the world behind the scenes. This makes a mockery of democracy. The kind of a system where private entities control the issuance of currency, powered by placing the population in debt to themselves, creates that kind of outcome.

Plus, debt-based systems have the worst rate of loss of purchasing power (poor SoV capability), and they siphon real wealth, real assets, from the masses and into the hands of the monetary system owners, through built-in and unavoidable debt default.

Worst, it forces us to destroy our home planet at an unsustainable rate. Because the debt-mechanism of issuing currency creates the need for “growth”. To grow faster than debt and inflation (also avoidable with different types of monetary systems). This forces people to optimize to profits instead of sustainability. They “must grow” or get eaten by the debt and inflation monster created by the system. But to “grow”, they must destroy the planet. Caught between a rock and a hard place. Damned if you do, damned if you don’t. Today, we are consuming 1.7 earths per year!⁹ That is obviously unsustainable, and a recipe for disaster.

We actually don’t need that kind of growth. It is the debt-based privately owned monetary system that needs it, no us. To keep the machine going without debt collapse. Continuous compound growth is impossible in a finite world with finite resources. The current monetary system, based on debt which has ballooning interest that calls to be repaid, is only sustainable if there is “growth”. Growth is forced on us all, to keep that debt machine from collapsing. So we try to find a million different ways to keep consuming, so we keep “growing”.

⁹ <https://www.overshootday.org/portfolio/we-would-need-1-7-earths-to-make-our-consumption-sustainable-washington-post/>

Everything you have, comes from the Earth. Your food, clothes, home, water, air. All of it, from Mother Earth. You must look after her, or else one day you simply won't have those things, and life will become very difficult and unpredictable once the delicate balance is ruined.

"The world community now faces together greater risks to our common security through our impacts on the environment than from traditional military conflicts with one another."

- The 1992 United Nations Conference on Environment and Development

I have shown in earlier chapters that the foundation of our monetary system on interest bearing debt creates a cancerous growth in debt. That, in turn, leads to a "growth imperative" for the entire economy, which causes both ecological devastation and social decay. I believe that it would be generally beneficial if we would work toward economic and financial arrangements in which interest is minimized. But most important, it is essential that we establish an exchange (monetary) system that avoids the imposition of interest on the medium of exchange at its creation.

We can take a giant step toward economic equity and general prosperity by designing complementary currency systems that avoid the imposition of interest.

It is one thing for holders of already created money which they have earned, to ask for interest on that part of their earnings they wish to "save." It is quite another thing to charge interest on newly created money, such as debit balances in a mutual credit system. If we can avoid the latter, the former will gradually wither away as well.

- Thomas Greco, "[Money](#)"

In short, this kind of system is unnecessarily destructive and unsustainable.

Now I hope we clearly understand that money doesn't come from work.

It comes from monetary systems and is later *injected* into work.

And there are many *other* possible types of monetary systems.

And the one we are currently using is arguably the worst kind.

Also...

Technically, you don't need money to produce outcomes. All you need is (1) people (2) resources and (3) tools.

Money only comes into play because we need a means of exchange and a store of value in modern society. That is why we inject money into work, but it is not a strictly necessary ingredient.

Sure, if you have money, lots of it, you can easily get people, tools, and resources to come work for you. Because people won't normally agree to come work for you for nothing, or to give you resources for nothing, or make you tools for nothing. But theoretically, if they did agree to give you labor, resources, and tools for free or for payment later on, you could produce work and outcomes without money.

The point is that work doesn't create money.

Money doesn't come from work.

Money comes from monetary systems, is created in monetary systems, and is then *injected* into work.

This is a very important concept to keep in mind when designing DeFi solutions. Because you **don't** have to get money **first**. You can make it out of thin air (of course, considering suitable monetary and fiscal practices), and then inject it into a community of people who have tools and resources.

That is the hidden power of DeFi when we finally master it.

Now, let's examine banks and banking:

Bank = A company or institution that engages in banking activities.

Banking = Activities that include money supply, deposit taking, lending, personal banking, corporate banking, investment banking, private banking, transaction banking, insurance, consumer finance, trade finance and other related.

I guess what Bill Gates was alluding to is that the "bank" can be significantly replaced by technology (like the blockchain and DeFi).

But regardless of technology, we still require banking. But banking doesn't need to be done by banks.

See the difference? Banks are not the only ones capable of conducting the activities of banking. I'm not speaking of legislation and regulation here. I am speaking of capability.

Traditionally, banking was done by banks, but with DeFi, banking can be done by software code. Maybe not completely, but significantly.

Banks have done a great job connecting the world financially over the years. However, I believe banks will have to radically reinvent themselves, or die, especially once DeFi really takes off full swing. Because the powerful monopoly over banking activities that banks enjoyed for a few hundred years will be taken away by DeFi.

Having said that, let me be clear. This book is not against banks, per se. That's not the point. It is for financial inclusion, efficiency, and fairness for all humankind and the earth.

Whereby mediums of exchange are no longer only produced out of debt-based privately owned monetary systems.

And that means you can exercise any and all of your abilities in any and all sorts of different ways and exchange them for various types of suitable mediums of exchange, as need be.

It is about eliminating or bypassing the artificial scarcity created by privately-owned debt-based monetary systems.

Eliminating the wealth gap, and the debt-trap.

Leading to a healthier global society and ecosystem.

That's the point.

I think, as with everything in life, some banks will be wiped out by this movement, and some will find ways to work with it and become even better stronger banks than they are today.

End Game: More Freedom, Peace, Prosperity & Financial Inclusion for All Humankind

"Man is born free and everywhere he is in chains."

- Jean-Jacques Rousseau, "[The Social Contract](#)"

"None are more hopelessly enslaved than those who falsely believe they are free."

- Johann Wolfgang von Goethe

This book is about money.
But money is a means to an end.
And the end game is Freedom!
The most basic of all human needs and rights.
What everyone wants.
Freedom.

So, let's start at the end. Freedom for all. And work backwards to understand how we can create monetary systems that fulfill this end, through DeFi. While still considering practical realities, and the health of our home planet.

The current system makes producers slaves to money. There are three factors that create this condition. First, because money can come into circulation only through borrowing, a producer, one who owns real wealth, is allowed to convert that wealth to money only by becoming a debtor and using his or her wealth as collateral. Second, because interest is levied on this debt, most of the value, over time, is transferred to nonproducers who control the money and banking process. Third, because the amount of money is artificially regulated and kept in short supply relative to the amount needed for the repayment of debts, some producers will inevitably default on their loans and be forced to forfeit their collateral.

- Thomas Greco, "[Money](#)"

Money As a Technology and Tool for Freedom

When you look at it this way, you realize that money is the TECHNOLOGY & TOOL that enables our inalienable right to freedom. Not democracy, but money.

Yes, democracy is good and very important, but it is not the same as freedom. Democracy is simply the right to vote for public officials, every 4 years or so. At it's ideal, it is the concept of "majority rules". That is not the same thing as freedom (although it provides more freedom than, say, a

dictatorship). So, in a way, money is what gives you actual freedom. Because it gives the holder “go power”.

In a democracy, without money, you are stuck. No freedom.

With money, you have agency, you can do things. Practical, personal freedom. A tool. Democracy is a political framework, money is the tool (at least for now, in our current society).

If the control of your money supply is entirely outside your hands, then you are not free. You need a level of control of your money supply to have true freedom.

"If the American people ever allow private banks to control the issue of their currency, first by inflation, then by deflation, the banks and corporations that will grow up around them will deprive the people of all property until their children wake up homeless on the continent their Fathers conquered.... I believe that banking institutions are more dangerous to our liberties than standing armies.... The issuing power should be taken from the banks and restored to the people, to whom it properly belongs."

– Thomas Jefferson, 3rd US President and Founding Father

S(h)e who owns/controls the monetary system also controls you. Because they can control your focus and attention, your time and energy, your perception and creative ability. Because you need money to survive, they can channel your energies and faculties by dictating your money access and flow, forcing you to play by their tune. The Pied Piper. That is one reason why billions of people spend their lives doing jobs they hate, to earn money they require, and rarely is it enough to leave the proverbial “rat race”.

And that is why the blockchain is so important. It places the power of co-owning the monetary system into your hands, at least to a greater extent.

Redefining Freedom, Democracy, Government, Social Contract, And Law from A Financial Inclusion Context

Freedom = The individual sovereign authority and ability to think, feel and act as you see fit, while respecting the same freedom in others.

According to the United Nation's [Universal Declaration of Human Rights](#)¹⁰:

- Article 1: All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.
- Article 2: Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional, or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty.
- Article 3: Everyone has the right to life, liberty, and security of person.
- Article 4: No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.
- Article 5: No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment.

¹⁰ <https://www.un.org/en/about-us/universal-declaration-of-human-rights>

Democracy = A system of government by the whole population or all the eligible members of a state, typically through elected representatives. Control of an organization or group by the majority of its members.

We need both. Freedom and democracy. But we must be aware that democracy is not the same thing as freedom. Yes, it is one of the many ingredients that enable freedom, but in and of itself, it is not freedom. And yes, democracy is a value we ought to defend and support (until we find a better system, which we haven't yet), even as we seek ways to fix it and improve it. But it is still not the same as freedom, by any definition besides rhetoric.

If you have money, you have a higher level of sovereign authority and ability to think, feel and act as you see fit. If you don't have money, you are forced to think within a scarcity box and act along very narrow confines designed for you by other people. You are no longer sovereign, you no longer have agency (ability to act). In effect, you are in bondage.

Slavery = Excessive dependence on or devotion to something. Also: servitude; bondage; subjugation.

When we consider these definitions, we might conclude that modern money doesn't really promote freedom for most people. Instead, we might conclude that, for most people on earth (not for all), it is a consciousness and energy trap. Because it surreptitiously and covertly controls our focus and attention, our time and energy, our perception and creative ability. AKA Slavery.

Or as Robert Kiyosaki ([Rich Dad, Poor Dad](#)) says, it is like an IV drip that gives you just enough to stay alive, but not enough to leave the hospital.

Most men would feel insulted if it were proposed to employ them in throwing stones over a wall, and then in throwing them back, merely that they might earn

their wages. But many are no more worthily employed now.

- Henry David Thoreau

Clearly the most unfortunate people are those who must do the same thing over and over again, every minute, or perhaps twenty to the minute. They deserve the shortest hours and the highest pay.

- John Kenneth Galbraith

Government = The group of people with the authority to govern a country or state. The system by which a state or community is governed. The action or manner of controlling or regulating a state, organization, or people.

Social Contract = An implicit agreement among the members of a society to cooperate for social and public benefits, for example by sacrificing some individual freedom for state protection and provision of public services and security. Theories of a social contract became popular in the 16th, 17th, and 18th centuries among theorists such as Thomas Hobbes, John Locke, and Jean-Jacques Rousseau, as a means of explaining the origin of government and the obligations of the population. Social contract theory says that people live together in society in accordance with an agreement that establishes moral and political rules of behavior, in service of the needs of the public at large.

Republic = A state in which supreme power is held by the people through their elected representatives, and which has an elected or nominated leadership rather than an absolute monarch. Also, the protection of minority rights, an exercise of tolerance and intercultural dialogue, encouraging mutual respect and understanding, whereby the

different groups that comprise a society should be able to engage and cooperate with one another, while preserving their own identity and liberty.

The Law = The system of rules which a particular country or community recognizes as regulating the actions of its members and which it may enforce by the imposition of penalties. In short, the law is a pre-agreed set of behaviors (if this happens, then that happens).

Now, here is how those last four definitions connect to each other, ideally, in summary:

- The public is bound to the government, and vice versa, through social contract and, by extension, the law.
- The social contract is defined and regulated by law. The law ideally reflects the wishes of the masses, while respecting the values of a republic (individual rights).
- The government's job is to fulfill the social contract in service to the public and the individual, as per the law.
- The law's job is to tie the public to the government and vice versa, and to each other, in a predictable way (hence, creating a civilization), as per the social contract of the republic.
- The public's obligation is to follow the law and finance the government.

In an ideal world, this is meant to work well. It is meant to be functional, adaptable, and sustainable.

But we do not live in an ideal world.

When any one or more of these pieces fail, we have a revolution. Because needs and expectations are unmet, to one extent or the other. And I believe this is what has brought about the current and ongoing monetary revolution, powered by the blockchain, and started by one Satoshi Nakamoto. Because necessity is the mother of invention.

“The Times 03/Jan/2009 Chancellor on brink of second bailout for banks.”

Enter Satoshi Nakamoto

For Satoshi to have placed that statement as block 0 of the world’s first blockchain, the Bitcoin blockchain, indicates to me that he was frustrated with the way things were going within the financial system. But I cannot know for sure because no one knows who Satoshi is, let alone contact Satoshi.

No one knows whether Satoshi is a woman, man, group of people, or institution.

Amid the GFC (Global Financial Crisis) of 2007 – 2009, one [Satoshi Nakamoto](#)¹¹ appeared out of nowhere, introduced the concept of the blockchain and, by extension, Bitcoin. Satoshi helped build it, refused to discuss who her/his/their identity was, and then disappeared. True story.

A mysterious leader. A reluctant hero. An anti-hero even maybe.

Satoshi seems to simply have had enough of this s**t and did something about it. Then vanished.

Was Satoshi afraid for his/her/their life? That’s reasonable, considering the powerful forces against this kind of change. Whatever the reason for Satoshi’s anonymity, we don’t know.

Anyway, through the course of this book, we will see more and more about Satoshi’s mindset and probable goals.

What is most important to us is that Satoshi introduced the blockchain to the world.

Enter The Blockchain

¹¹ https://en.wikipedia.org/wiki/Satoshi_Nakamoto

Blockchain = Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain.¹² Blockchain is a mechanism for recording information that is unalterable and does not depend on trusting a third party.¹³

For finance, how does the blockchain compare with the current system?

A network of heavily regulated intermediaries facilitates transactions between parties by reconciling transaction data and assuming some of the inherent risk to make the current financial system possible. This network was developed piecemeal, in response to different needs at different times and utilizing different technologies. Within this network, financial institutions maintain proprietary ledgers of transactions with minimal transparency into each version. Therefore, these institutions, and all market participants must invest in costly software to reconcile transaction data, which remains vulnerable to error and fraud. They must also submit to periodic audits to ensure their proprietary ledgers have been recorded accurately.

If all relevant parties could see the same ledger of transactions at the same time, then it could eliminate the expensive inconveniences and much of the accompanying risk; everyone could easily work from one accessible source of truth. Enter blockchain.

¹² <https://www.euromoney.com/learning/blockchain-explained/what-is-blockchain>

¹³ <https://enterpriseproject.com/article/2018/6/how-explain-blockchain-plain-english>

Blockchain technology is computer software that provides an immutable, transparent, fraud-proof ledger that shares transactions between participants in real-time via the Internet. With an Internet connection, a smart device, and access to a blockchain ecosystem, financial opportunities can be at the fingertips of those in previously unreachable markets. Blockchain can function within, without, or alongside current financial systems, opening economic possibilities for newcomers and incumbents alike.

- Rachel W. Robinson, Blockchain Serving the Unbanked, [Blockchain Research Institute](#)

People and institutions who do not know or trust each other, reside in different countries, are subject to different jurisdictions, and who have no legally binding agreements with each other can now interact over the Internet without the need for trusted third parties like banks, Internet platforms, or other types of clearing institutions.

Chain of Blocks: In a blockchain network, token transactions are recorded in batches of data called “blocks” that are “hashed.” This cryptographic hash creates a digital fingerprint of the block. Each block includes the hash of the prior block, thereby linking one block with another into a chain of blocks. This process guarantees the historic integrity of all the blocks back to the first block, also referred to as the genesis block. If

data in one block is altered, the hash value of the block and all subsequent blocks will change, and every node in the network will know that the data has been tampered with. This growing list of chained blocks is also referred to as the ledger. The ledger is a file that maintains a growing list of transaction records, chained in blocks that are cryptographically secured from tampering and revision. If manipulation attempts were made, the hash value of the manipulated ledger would not coincide with the hash value recorded on the copies of the ledger on all other nodes. The hash value of a block therefore serves as a counterfeit protection that can be used to check the authenticity of a transaction on a ledger.

Distributed Ledger: A copy of the ledger is stored on multiple nodes of a cryptographically secured P2P network. In order to change the ledger data on all copies of the ledger throughout the whole network, the network nodes need to reach a mutual agreement about such a change. A distributed ledger is a shared, trusted, public ledger of transactions that everyone can inspect, but which no single user controls. Each independent node has the latest version of the ledger, which contains all transactions that have ever been made, and can verify transactions. This process is referred to as “consensus.” This is particularly useful in inter-organizational setups where no institution wants to trust another institution with the management of their data.

- Shermin Voshmgir, [“Token Economy”](#)

As you can see, the blockchain solves the “trust problem”.

In the old financial system, one of the roles that government and banks played was to ensure and enforce a level of trust.

With the blockchain, we now have an even higher level of trust, without the need for banks or governments to secure that trust. We now have a mechanism for cheaper, faster, better, more efficient, more secure trust.

“The root problem with conventional currency is all the trust that’s required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust.”

- Satoshi Nakamoto

“Banks must be trusted to hold our money and transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve. We have to trust them with our privacy, trust them not to let identity thieves drain our accounts. Their massive overhead costs make micropayments impossible.”

- Satoshi Nakamoto

Another problem the blockchain solves is the “Double-Spend Problem”.

Think about it. We can make endless copies of digital stuff. Piracy of film, music, games, and other files is rampant.

That is NOT something that should happen with money. If we can make endless copies of the dollars in my account, it would wreak havoc to the system.

In the past, banks have ensured this doesn’t happen. And governments have punished forgers when it did happen.

Blockchain solves this problem, making it impossible or prohibitively expensive to make copies. No need for banks and governments for this function. Blockchain does a much better job at eliminating double-spend, cheaper and faster.

“When there are multiple double-spent versions of the same transaction, one and only one will become valid.”

- Satoshi Nakamoto

What The Blockchain Means to The World (The Bigger Picture)

The business models of many Web2 tech giants like Amazon, eBay, Airbnb, and Uber result from the lack of a trustful native value-settlement layer and user centric-identity systems. Smart contracts in combination with user-centric identity systems can provide a solution to both problems. They can formalize

the relationships between people and institutions and the assets they own, entirely P2P, without the need for trusted intermediaries.

- Shermin Voshmgir, "[Token Economy](#)"

In 2008, a new technology was quietly introduced. The blockchain. A technology that has the ability to create societies of the future. Society 3.0.

Society 3.0 is a societal model, powered by new, low-cost technology that is available to everyone everywhere, that solves many of our current problems in these areas:

1. Money
2. Politics
3. Law
4. Energy
5. Production

Let me explain.

Today, we live in Society 2.0 (or 2.x).

Our societies are:

1. **Hierarchical** - social systems in which members of society are ranked in a pyramid structure. The top of the pyramid rules the lower ranks. Think about it: money, politics, law, energy (fuel), and resource production are all hierarchical in our society, right?
2. **Centralized** - social systems in which a central authority controls or manufactures. Central authorities are at the top of the hierarchical pyramids. Think about it, we have central banks to regulate the economy, parliament/senate/president to govern the country, supreme courts to settle disputes, oil refineries and utilities companies to provide energy, multi-national corporations

for food production, pharmaceuticals, and so on... We live in a centralized society.

That is Society 2.0: Hierarchical and Centralized.

Society 1.0 is what we had before industrialization and agriculture.

Humans lived in groups. The group may have had a leader or a council of elders, but there was no concept of regional, national, or global hierarchies, or centralized control.

Society 1.0 was Decentralized (minimal central authorities or producers) and Autonomous (having the freedom to govern itself or control its own affairs, act independently, and produce its own resources etc.).

Society 1.0 became Society 2.0 with the invention of agriculture, industry, and banking.

To take advantage of the benefits of agriculture and industry, society had to centralize and create hierarchies. It gave up freedom in exchange for security and progress.

And that was good for a while. We had to do that, at that time, at that stage of our evolution.

It served a purpose.

However, Society 2.0 also has its limitations and disadvantages, as we all know.

I mean, look around you; we live in a controlled matrix where most people live a somewhat “A4” lifestyle, a “template” lifestyle, and it all revolves around “jobs and money, survival”, and it is all controlled and determined by an elite minority.

Again, that was necessary at the time.

But society is capable of much more than that. Much more.

It is capable of transcending survival!

This vast universe was not all built, in all its amazing splendor and magnitude, just so that most humans must wake up at 6 am, brush teeth, commute to job, earn currency, commute back at 6 pm, have dinner, sleep, repeat till death - for survival.

A much more dynamic, richer, diversified, deeper life experience for all mankind, everywhere, is possible.

However, this was not possible before 2008.

And now it is.

It is now possible because of the invention of a technology called the blockchain.

Society 3.0 means going back to Decentralized and Autonomous societies, while keeping and improving on all the advantages of the modern world, and eliminating many of its problems.

You see, in the past, we needed government to provide the trust framework that guaranteed currencies, laws, politics, energy/fuels, and production.

But with the invention of the blockchain, we no longer need government to provide the trust framework itself.

The blockchain provides even better trust than the government ever can, and it is corruption free, bureaucracy-free.

Of course, we still need some government for certain other things. Definitely. We are not advocating for anarchy here.

What we are saying is that we can shrink government's size, make it lean, light and nimble, and honest. Transfer most of the powers back to the people, using the blockchain technology.

The blockchain technology provides a quantum leap in trust and efficiency, compared to what government bureaucracy and politicians can ever, ever offer.

Shifting trust functions away from politicians and government and into the hands of the citizens and securing it with the blockchain to ensure integrity and trust, makes government smaller, faster, responsive to the people's wishes, honest, and so on.

The same can be said for money supply, banking, energy, and production and distribution of goods. They can be shifted to the people using the blockchain and other new technologies such as 3D printing.

"Yes, [we will not find a solution to political problems in cryptography,] but we can win a major battle in the arms race and gain a new territory of freedom for several years. Governments are good at cutting off the heads of a centrally controlled networks

like Napster, but pure P2P networks like Gnutella and Tor seem to be holding their own.” - Satoshi Nakamoto

Here, we are focusing on just one of those possibilities: decentralized finance (DeFi).

Enter Decentralized Finance (DeFi)

“I must create a system, or be enslaved by another man's. I will not reason and compare: my business is to create.”

- William Blake

"If the American people ever allow private banks to control the issue of their currency, first by inflation, then by deflation, the banks and corporations that will grow up around them will deprive the people of all property until their children wake up homeless on the continent their Fathers conquered.... I believe that banking institutions are more dangerous to our liberties than standing armies.... The issuing power should be taken from the banks and restored to the people, to whom it properly belongs."

- Thomas Jefferson, 3rd US President and Founding Father

Money is a central part of our life, but we are not in charge of it. The amount of money in the economy, how it is regulated, and who has access to it is controlled by an elite of private bankers and politicians, and this gives that elite huge power to enrich themselves and control the rest of us.

Problem: We are forced to take jobs we might hate to earn money.

Solution: We need money that we create, to meet our needs in ways we find fulfilling.

Problem: We are not treated equally.

Solution: We need money that rewards people fairly for the work they do.

Problem: We value money too highly and it makes us unnecessarily competitive.

Solution: We need a more convivial form of money that helps us live at the pace we want to, earning the living we want to. We don't want to have to chase after money, or to covet it. We need to see money as a tool, not something of value in itself.

- Peter North, "[Local Money](#)"

Decentralized Finance (DeFi) = Decentralized Finance is a blockchain-based form of finance that does not rely on central financial intermediaries such as brokerages, exchanges, or banks to offer traditional financial instruments, and instead utilizes smart contracts on blockchains. It differs from Centralized Finance (CeFi) by eliminating the need for gatekeepers and intermediaries, and empowering everyday people via peer-to-peer exchanges.

"Conventional banking requires a vast infrastructure to maintain trust between strangers, from clearinghouses and compliance to capital rules and courts. It is expensive and often captured by insiders: think of credit-card fees and bankers' yachts. By contrast, transactions on a blockchain are trustworthy, cheap, transparent, and quick..."

The rise of an ecosystem of financial services, known as decentralized finance, or "DeFi," deserves sober consideration. It has the potential to rewire how the financial system works, with all the promise and perils that it entails. The proliferation of innovation in DeFi is akin to the frenzy of the invention in the early phase of the web..."

As with the internet in the 1990s, no one knows where the revolution will end. But it stands to transform how money works and, as it does so, the entire digital world."

- [The Economist, September 18, 2021](#)¹⁴

DeFi is groundbreaking. We are witnessing a financial revolution happening right in front of us, one which democratizes access to finance, promotes financial inclusion, and promises financial transparency.

Anyone in the world with access to the Internet can now participate in this grand financial experiment.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

Some of the things DeFi allows us to achieve:

Transparency: *A transparent, auditable financial ecosystem.*

Accessibility: *Free access to DeFi applications without fear of discrimination on race, gender, beliefs, nationality or geographical status.*

¹⁴ <https://www.economist.com/leaders/2021/09/18/the-beguiling-promise-of-decentralised-finance>

Efficiency: Programmable money makes it possible to remove the centralized middlemen to create a more affordable and efficient financial market.

Convenience: Money can now be sent anywhere, anytime and to anyone who has access to a cryptocurrency wallet for a small fee and with little waiting time.

- Darren Lau, Daryl Lau, Teh Sze Jin, Kristian Kho, Erina Azmi, TM Lee, Bobby Ong, "[How to DeFi: Beginner](#)"

No Puppy Left Behind

For a little taste of how DeFi has saved people when CeFi let them down in the gutter, see these examples:

1. "[Carolina Lopez learned early in her life a hard lesson about the instability of Argentina's economy...](#)"¹⁵
2. "[Bitcoin has saved my family...](#)"¹⁶
3. [Venezuelans use cryptocurrency to bypass corruption, inflation](#)¹⁷

Remember, we are only in the very early stages of DeFi.

It is still an infant.

A very strong infant.

Imagine it's power once it is all grown up!

¹⁵ <https://wander-argentina.org/2018/03/argentina-cryptocurrency-crazy/>

¹⁶ <https://www.nytimes.com/2019/02/23/opinion/sunday/venezuela-bitcoin-inflation-cryptocurrencies.html>

¹⁷ <https://www.rollcall.com/2019/09/10/venezuelans-use-cryptocurrency-to-bypass-corruption-inflation/>

“I would be surprised if 10 years from now we’re not using electronic currency in some way, now that we know a way to do it that won’t inevitably get dumbed down when the trusted third party gets cold feet.” - Satoshi Nakamoto

A Look Behind the Curtain

Who Controls the World? (These Swiss Researchers Have Found the Answer)

We start by looking at who owns/controls the world's largest companies (because banks are companies). As the [New Scientist magazine revealed in this 2011 article](#)¹⁸, we no longer need to resort to conspiracy theories to figure that out.

“The idea that a few bankers control a large chunk of the global economy might not seem like news to New York’s Occupy Wall Street movement and protesters elsewhere. But the study, by a trio of complex systems theorists at the Swiss Federal Institute of Technology in Zurich, is the first to go beyond ideology to [empirically identify such a network of power](#). It combines the mathematics long used to model natural systems with comprehensive corporate data to map ownership among the world’s transnational corporations (TNCs).

The work, to be published in PLoS One, revealed a core of 1318 companies with interlocking ownerships (see image). Each of the 1318 had ties to two or more other companies, and on average they were connected to 20. What’s more, although they represented 20 per cent of global operating revenues, the 1318 appeared to collectively own through their shares the majority of

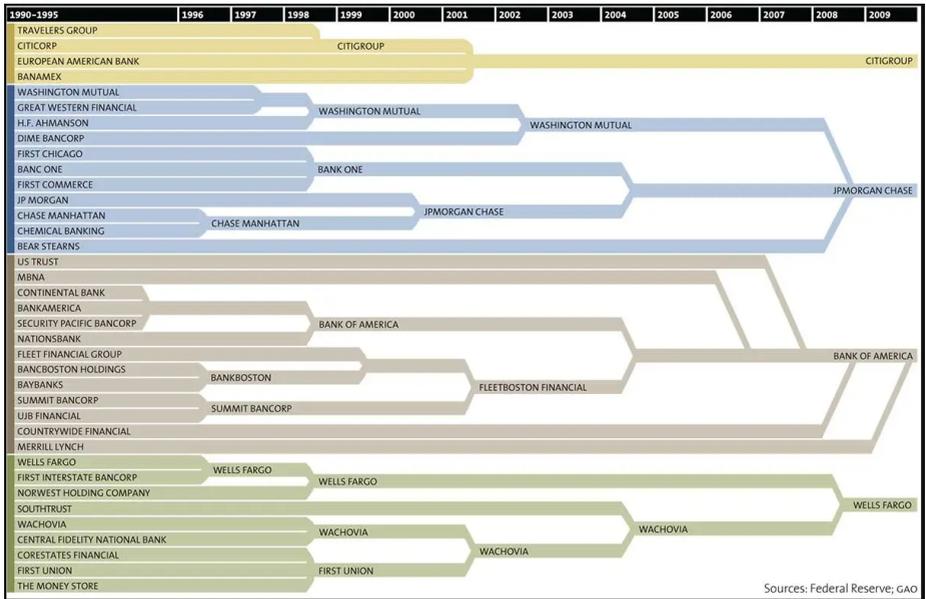
¹⁸ <https://www.newscientist.com/article/mg21228354-500-revealed-the-capitalist-network-that-runs-the-world/>

the world's large blue chip and manufacturing firms – the “real” economy – representing a further 60 per cent of global revenues.

*When the team further untangled the web of ownership, it found much of it tracked back to a “super-entity” of **147** even more tightly knit companies – all of their ownership was held by other members of the super-entity – that controlled 40 per cent of the total wealth in the network. “In effect, less than 1 per cent of the companies were able to control 40 per cent of the entire network,” says Glattfelder. **Most were financial institutions. The top 20 included Barclays Bank, JPMorgan Chase & Co, and The Goldman Sachs Group.**”¹⁹*

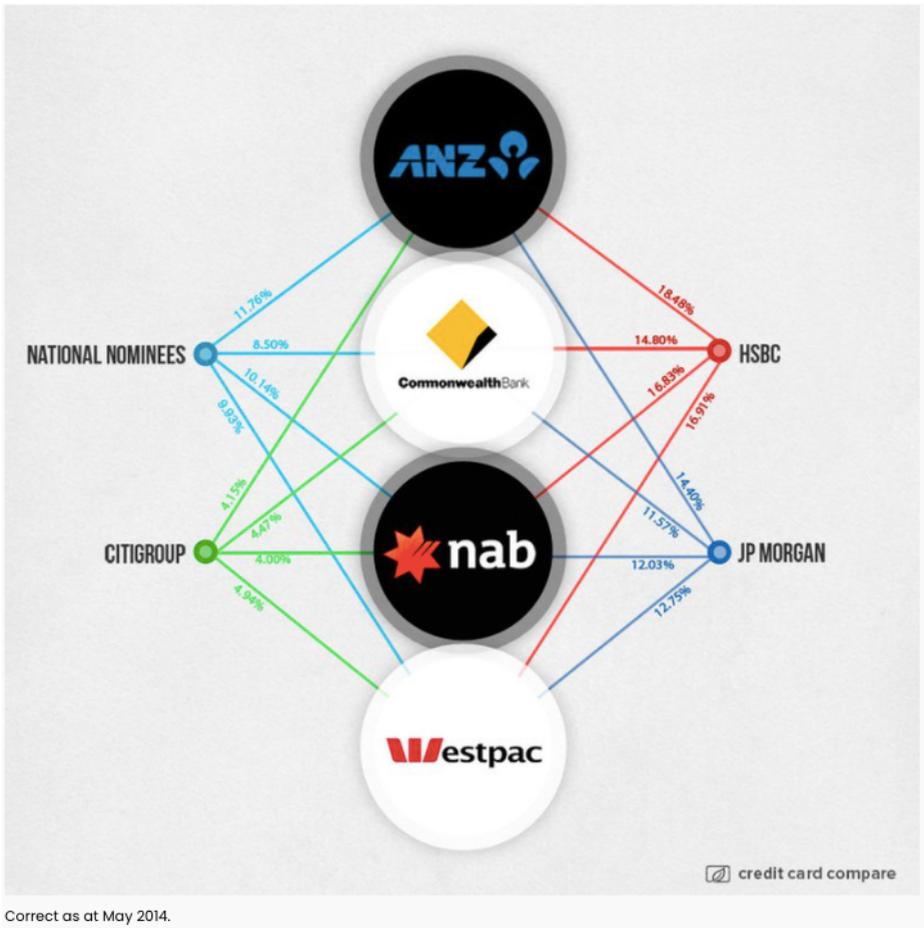
So, for example, in the USA, the big four banks have combined assets of about \$10 trillion. And they have ownership stakes in many of the smaller banks. The ownership structure looks like this:

¹⁹ <https://www.newscientist.com/article/mg21228354-500-revealed-the-capitalist-network-that-runs-the-world/>



So that's Citigroup, JP Morgan Chase, Bank of America, and Wells Fargo at the top of the pyramid.

Now, extending that example, Australia has four big banks (ANZ, Commonwealth Bank, NAB, and Westpac), with combined assets of about \$4 trillion or more. Who are their biggest shareholders? I don't know. But according to this article on finty.com, HSBC, JP Morgan, and Citigroup are key shareholders:



Correct as at May 2014.

IMAGE SOURCE: [HTTPS://FINTY.COM/AU/RESEARCH/BIG-FOUR-OWNERSHIP/](https://finty.com/au/research/big-four-ownership/)

However, it is practically very difficult or impossible to specifically say who owns what, when it comes to these giants. Nevertheless, it seems this sort of interconnection is repeated worldwide.

So, you see, it really is a global pyramid structure.

And a very significant player at the top of that pyramid structure, is the US Federal Reserve System.

Contrary to popular belief, the Fed is not a government bank.

Not at all.

It is a network of huge private banks.

And these private banks have monopoly power to issue the world's global reserve currency, the US Dollar, literally out of thin air, while everyone else must work for it. Furthermore, they "loan" this currency to the US Government, with interest. And that is how come the world is in debt. To private bankers, creating currency out of thin air, and issuing it as debt with interest.

As of August 31, 2020, federal **debt held by the public was \$20.83 trillion and intragovernmental holdings were \$5.88 trillion, for a total national debt of \$26.70 trillion**. At the end of 2020, debt held by the public was approximately **99.3% of GDP**, and approximately 37% of this public debt was owed by foreigners.

Crazy, but true.

So, let's see how the Fed Reserve started.

The Privately-Owned, Debt-Based Monetary System (How the Hell Did We get Here?)

How did the Federal Reserve start?



IMAGE SOURCE:

[HTTPS://WWW.WASHINGTONPOST.COM/NEWS/WONK/WP/2013/12/21/THE-FEDERAL-RESERVE-WAS-CREATED-100-YEARS-AGO-THIS-IS-HOW-IT-HAPPENED/](https://www.washingtonpost.com/news/wonk/wp/2013/12/21/the-federal-reserve-was-created-100-years-ago-this-is-how-it-happened/)

The basic plan for the Federal Reserve System was drafted at a secret meeting held in November of 1910 at the private resort of J.P. Morgan on Jekyll Island off the coast of Georgia. Those who attended represented the great financial institutions of Wall Street and, indirectly, Europe as well. The reason for secrecy was simple. Had it been known that rival factions of the banking community had joined together, the public would have been alerted to the possibility that the bankers were plotting an agreement in restraint of

trade—which, of course, is exactly what they were doing. What emerged was a cartel agreement with five objectives: stop the growing competition from the nation's newer banks; obtain a franchise to create money out of nothing for the purpose of lending; get control of the reserves of all banks so that the more reckless ones would not be exposed to currency drains and bank runs; get the taxpayer to pick up the cartel's inevitable losses; and convince Congress that the purpose was to protect the public. It was realized that the bankers would have to become partners with the politicians and that the structure of the cartel would have to be a central bank. The record shows that the Fed has failed to achieve its stated objectives. That is because those were never its true goals. As a banking cartel, and in terms of the five objectives stated above, it has been an unqualified success.

- G. Edward Griffin, "[The Creature from Jekyll Island](#)"



IMAGE SOURCE:

[HTTPS://WWW.FEDERALRESERVEHISTORY.ORG/ESSAYS/JEKYLL-ISLAND-CONFERENCE](https://www.federalreservehistory.org/essays/jekyll-island-conference)

The Federal Reserve has set the template for how almost all other banks in the world operate today.

Let's focus on this one goal of the Fed (and, by extension, most banks in the world), for it is the most disturbing of all:

*"obtain a franchise to create money out of nothing
for the purpose of lending"*

This are some of the grave ills that this one single goal creates in society:

Banks issue currency (bank credit) on the basis of promissory notes signed by their customers (borrowers). These notes may be secured or unsecured. A secured loan has specific assets named as collateral, such as a car or a house. An unsecured note has no specific collateral assets pledged to assure repayment of the loan. In the former case, if the borrower fails to make the payments as specified in the loan agreement, the bank can seize the collateral. Thus, cars are sometimes “repossessed,” and houses are “foreclosed.” So the bank, in actuality, monetizes your promise to repay. Or, to put it another way, the bank monetizes the value of your assets in the case of a secured loan, or the value of your labor and skills if your note is unsecured.

- Thomas Greco, “[Money](#)”

A recent German study on the transfer of wealth via interest from one economic group to another was conducted by Helmut Creutz, a monetary analyst and author. In his 2007 survey of German families, he grouped the entire sample into 10 income categories of approximately 3.5 million households each.

Because of the upward concentration of wealth caused by interest, there was a transfer of wealth from the bottom 80 percent of the population to the top 20 percent, especially the top 10 percent, due exclusively

to the interest feature of the monetary system used. This transfer of wealth occurred independently of the cleverness or industriousness of the participants, attributes often assumed to account for differences in income.

- Bernard Lietaer, Jacqui Dunne, [“Rethinking Money”](#)

By the way, we will see Bernard Lietaer’s name often in this book. Known as the “Architect of the Euro”, Dr. Lietaer designed the ECU, the mechanism which enabled the currencies of twelve countries in the Euro Zone to converge, while he was at the central bank of Belgium.²⁰ In short, he knows his stuff.

The politicization of money, banking, and finance has enabled the concentration of power and wealth in few hands—a situation that has been extremely damaging to societies, cultures, economies, democratic government, and the environment. The privileged private banking establishment has managed to monopolize everyone’s credit, enabling the few to exploit the many through their partiality in allocating credit, by charging usury and increasingly exorbitant fees, and by rewarding politicians for their service in promoting their interests. These two, government and banking, have colluded to create a political money system that embodies a “debt imperative” that results in a “growth imperative,” which forces environmental

²⁰ https://en.wikipedia.org/wiki/Bernard_Lietaer

destruction and rends the social fabric while increasing the concentration of power and wealth.

- Thomas Greco, "[The End of Money and the Future of Civilization](#)"

The recurrent disorder in the financial markets and the cascading failures of financial institutions should come as no surprise. It is not possible for humans to live sustainably on this earth under the present monetary regime. Why? The simple answer is, because money is credit created on the basis of loans made by banks at interest. Those who recognize the impossibility of perpetual exponential growth and who understand how compound interest is built into the global system of money and banking expect that there will be periodic "bubbles" and "busts," each of increasing amplitude until the system shakes itself apart.

Engineers call this phenomenon "positive feedback." Such a system cannot find equilibrium but eventually "explodes." Imagine a heating system in which the thermostat, sensing a rise in temperature, calls for more heat instead of less. Such is the nature of the debt-money system. The imposition of interest on the debt by which money is created causes debt to grow exponentially with the passage of time. It therefore demands that more debt be created to enable the payment of the interest due. Such is the debt imperative that gives rise to a growth imperative.

Among other things, it prevents the emergence of a steady state economy because no amount of production and increase in business activity can satisfy the lenders' demands for repayment.

Is the final round at hand, or can the system be saved yet one more time?

Today's centralized global money system (controlled as it is by a small elite class) is from the standpoint of equity, harmony, and sustainability, fundamentally flawed—and in my view, is a root cause of the mega-crisis confronting civilization. When that flawed money system is transcended, resolution of the other aspects of the mega-crisis will then become possible.

- Thomas Greco, "[The End of Money and the Future of Civilization](#)"

With the blockchain and DeFi, people worldwide can finally build a better system, whether the old system likes it or not.

This wasn't possible in the past.

Today it is.

As opposed to fiat currencies, no single centralized entity like governments and central banks can influence the price or the accessibility of protocol tokens. Control is therefore distributed, much like with commodities, where no single government or other entity controls the mining of gold, silver, oil, etc. Who has how much control in the system is subject to the token creation rules defined in the protocol. The token creation and

supply policy (monetary policy of the network) is the point of centralization that can only be changed by majority consensus of all network actors in the form of a software upgrade. The protocol therefore has functions of a central bank. Potential “central bank smart contracts” could account for more adaptive monetary policy than the one Bitcoin network provides. Such trends to make the monetary policy of a token more adaptive and stable are emerging.

- Shermin Voshmgir, “[Token Economy](#)”

Besides being extremely unfair and damaging to much of the world, the old ways are... how can I put this... very old indeed! They have passed their use-by date!

The money that is in use today was actually designed in the 17th and 18th centuries, a mostly preindustrial epoch untroubled by pollution, greenhouse effects, and overpopulation. The vast majority of the world’s estimated 700 million people back then were farmers living in rural settings, who rarely ventured far from their homes or villages, and whose economic activity consisted mostly of local barter exchanges. Money was in limited use, especially in rural England, the country in which much of the world’s current monetary paradigm originated.

The emergence of our [current] monetary paradigm occurred at a time when the medical treatment of choice for the prevention and treatment of illness and

disease was bloodletting—the removal of often-copious amounts of blood from patients. Though actually harmful to patients in the majority of cases, bloodletting remained the most common medical practice from antiquity up until the late 19th century. When, for example, George Washington came down with a throat infection, nearly four pounds of his blood were removed. It was far more likely the treatment and not the illness that contributed most to his demise.

The practice of bloodletting and the many notions that justified it, as well as the explanations that were offered time and again for a patient’s inevitable decline, went unchallenged by one generation after another for the better part of 2000 years. Notwithstanding the brilliance of the theories in support of this practice and the physicians that espoused them, both theory and practitioner were mistaken. But in the absence of bacteriology, immunology, and other common understandings available to us today, this flawed medical procedure had the appearance of certitude and managed to endure for millennia.

Our megatrends persist not because they are intractable but, once again, because we are using a very limited set of monetary tools that were put in place by another age.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Today, we have over 7 billion people (vs the 700 million then), and the planet is in grave ecological peril if we don't act RIGHT NOW!

Besides, the banking and monetary systems are in a state of great instability, overladen with debt and inflation, with systemic collapse imminent.

The current monetary system is old, o-l-d, as in medieval old, "before electricity, steam engine, and petroleum" old.

It is even older than our outdated education system.

It is time for alternatives.

And really, we don't have a choice.

Because the fate of our home planet requires us to consider non-monetary activities. Otherwise, we won't be able to save it and ourselves.

The consequences of not taking into account nonmonetary activities are unfortunate and significant. Many such exchanges are critically vital to the social fabric of society and comprise a significant portion of overall economic activity in communities and nations. Yet, they remain invisible to conventional economics because no money changes hands.

The decline of a nonmarket economy, such as the social breakdown of a family or community, is a negative prospect for society. Yet, from a strictly monetized economic perspective, it is not measured and therefore has no value. If, however, the breakdown gets to the point where paid intervention is needed, the costs of social decay are then registered as profit.

As economists Clifford Cobb, Ted Halstead, and Jonathan Rowe have pointed out, "The GDP not only masks the breakdown of the social structure and the

natural habitat upon which the economy—and life itself—ultimately depend; worse, it actually portrays such breakdown as economic gain.”

Costs associated with psychological counseling, social work, and addiction treatment, which arise from the neglect of the nonmarket realm, are tallied as economic gains. Crime adds billions to the GDP due to the need for prison buildings, increased police protection, and repair of property damage. Similarly, the depletion of our natural resources, the clean up and medical treatments associated with industry’s toxic byproducts, the costs of ecological disasters such as the Exxon Valdez and recent British Petroleum oil spills, the terrorist attacks of 9/11, relief efforts following Hurricane Katrina, the devastation caused by wars, and the hundreds of billions of dollars allocated in emergency stimulus packages—all register as improvements to a nation’s economy by the curious standards of the GDP.

The following critique of the GNP was given by Robert F. Kennedy at a rally for Friends of the Earth in New York in 1963. It was reechoed in large part by the Senator in one of his last speeches in March 1968:

“The Gross National Product includes air pollution and advertising for cigarettes, and ambulances to clear our highways of carnage. It counts special locks for our doors, and jails for the people who break them. GNP includes the destruction of the redwoods and the death of Lake Superior. It grows with the production of napalm and nuclear warheads...and if GNP includes all

this, there is much it does not comprehend. It does not allow for the health of our families, the quality of their education, or the joy of their play. It is indifferent to the decency of our factories and the safety of our streets alike. It does not include the beauty of our poetry or the strength of our marriages, or the intelligence of our public debate or the integrity of our public officials...GNP measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile."

Indonesia, for example, has been a huge success story since the 1970s according to GDP standards. But it achieved this status by clear-cutting its forests, exhausting its soil, and selling off precious nonrenewable mineral wealth. In short, it sold off its future to pay for accounting measures of success.

- Bernard Lietaer & Stephen Belgin , ["New Money for a New World"](#)

National currencies are now technically defined as "fiat" money. Fiat takes its origin in the very first word that God spoke in the Latin version of Genesis: Fiat lux ("let light be"). It implies the godlike ability to create something out of nothing ("ex nihilo") through the power of the word or, in practice in this case, the stroke of a pen. This means that money isn't something that

comes out of a farm, a mine, a mint, or even a printing press. It comes into being by the power of the word or, in these times, a stroke of a computer key.

So what makes one form of money more desirable than another? As economics professor L. Randall Wray writes, "In all modern economies the government defines money by choosing what it will accept in the payment of taxes. Once it has required that the citizens must pay taxes in the form of particular money (for example dollars), the citizens must obtain that money to pay taxes. In order to obtain that which is necessary to pay taxes, or money, they offer labor services or produced goods to the government (as well as to markets). This means the government could buy anything that is for sale for dollars merely by issuing dollars." Therefore, a sovereign government does not really "need" to raise taxes to pay for its expenses. Once this is understood, it becomes clear that neither taxes nor government bonds "finance" government spending. Instead, taxes are required to give value to money.

In reality, in the money domain, everything starts and ends with government. At the commencement of the process, the government decides what it will accept in payment of taxes. Historically, it has chosen specific commodities, such as wheat or other food products, bronze or copper ingots, beaver pelts, tobacco leaves, or gold or silver bullion. This obligation puts the population to work to find or produce those commodities. Today, with fiat currencies required for the payment of taxes, the population works, trades,

and invests in national currencies so they can meet their responsibilities.

It's the same story worldwide. This is true regardless of the country of issuance, the political philosophy (capitalist, communist, socialist, fascist, totalitarian, despotic, or democratic), and the different designations, and despite differences in material composition, shape, or particular motif. The currencies are, each and every one of them, the same type of money that is required by the state for the payment of taxes.

By type, what is meant is that all national currencies have the same design features. The design does not mean how the money actually looks—pictures of heads of state looking presidential or regal—but how it is created. This in turn informs how it operates. Like a car, money has an engine that drives certain behaviors, and how that engine is built will influence its performance.

Not only are all conventional national currencies fiat based but also they are hierarchical in that the monopoly of currency creation has been given to the banking system under the supervision of a central bank. Furthermore, conventional currency needs to be kept scarcer than its usefulness to maintain its value, and consequently, there is competition to procure it. The implications of the functional dynamics of national money have some profound repercussions for society at large.

- Bernard Lietaer, Jacqui Dunne, "[Rethinking Money](#)"

Ultimately the history of how we got to the current monetary system is a very broad subject, and beyond the scope of this book. For this, I recommend you read the books "[Layered Money](#)" by Nik Bhatia, "[New Money for a New World](#)" by Bernard Lietaer and Stephen Belgin, "[The Creature from Jekyll Island: A Second Look at the Federal Reserve](#)" by G. Edward Griffin, and "[Rethinking Money](#)" by Bernard Lietaer and Jacqui Dunne.

The Scarcity Myth Busted

Crucial Lessons from The Great Depression of 1929 to 1939 (How the Artificial Scarcity of Money Caused a Decade of Misery)

The Great Depression ran from 1929 to 1939. People suffered greatly.







It started when 9000 banks failed, right after the stock market crash of 1929.

People went to the banks, scared, and asked for their money in cash. That is called a “bank run”.

Everybody did a bank run, only to realize that money doesn't exist as cash.

Banks don't have cash. Try walk into a bank today and ask for, say, \$50,000 in cash and see what they say. Even if you have \$1 million in your account, it is very hard to show up and get \$50,000 unannounced, in cash. They will ask you to give them some time.

Less than 4% of the money in the world exists as cash. Over 96% exists only as records on bank ledgers. Numbers on a computer. That's why today when banks collapse, or when they look like they're about to collapse, the government jumps in shuts down the bank to prevent a bank run. And then they “rescue” the bank.

A bailout.

Otherwise, the whole system collapses. The “confidence trick” collapses.

That's why bank bailouts happen. To maintain the illusion. It has to be done to prevent a systemic bank run and crash.

That's what almost happened in 2008. That's why governments everywhere went and rescued the banks, to prevent inevitable systemic failure and collapse of society.

Anyways, back to 1929.

The Great Depression.

Listen to this very carefully.

The economy completely collapsed. This was **despite the fact that people to work didn't disappear**. The **labour force didn't die**. They were begging for work. All available. They didn't go anywhere. The **things needing to be done (work) didn't disappear**. Roads still needed to be built, and so on. The things that we're doing in 1927, was still around in 1929 to 1939. The things to do didn't disappear. The **resources and the assets didn't disappear**, the factories didn't disappear. Yes, they closed their doors, but they didn't disappear, the machines were still there, just shut down.

Theoretically, the people could walk into the factories and do the things that needed to be done.

So why didn't they?

Why did they, instead, suffer miserably for 10 years?

Listen to this carefully: **the reason why was because the monetary system itself collapsed.** It's **only** the monetary system that collapsed. Nothing else collapsed. But psychologically, this meant that “there is no money”, which means “there are no jobs”, because there was not enough official currency available to "pay wages" and "buy materials".

The MoE disappeared. That is all.

We can say that there wasn't enough “permission slips” to issue for people to confidently exchange their resources and time.

The point is, **despite the presence of resources, tools, people, and things to do, the world suffered for 10 years because the means of exchange was halted.**

That is **artificial scarcity.**

The 10 years of suffering would have been **avoided if there was an alternative monetary system.**

This is a very important lesson, and it is the kind of thing that DeFi will solve.

Economic depressions are typified by a scarcity of ordinary money. Indeed, most depressions are caused by restriction of the money supply by the monetary authorities. The subsequent felt lack of adequate payment media causes people to become fearful and to hoard what money they do have. This hoarding slows its velocity of circulation, which further reduces the volume of business being conducted. Thus, the depression deepens until money becomes plentiful again and people feel confident about spending it. Replenishment of the supply of official (debt) money requires not only an increased willingness of the banks

to lend but also a willingness of individuals and businesses to borrow. People's experience of monetary stringency and slack business demand during a depression, however, makes them loathe to incur new indebtedness.

- Thomas Greco, "[Money](#)"

The Case Against Monoculture (Building a More Resilient Ecosystem)

Monoculture = the cultivation of a single type of crop or creature in a given area.

Polyculture, where more than one crop species is grown in the same space at the same time, is the alternative to monoculture. Nature does polyculture. Never monoculture.

The ecosystem is healthiest when it has a wide variety of creatures.

Even mongrel dogs are healthier and live longer than pure breeds.

And scientist have found a link between monoculture and food starvation. And between monoculture and emotional deficiencies.

Polyculture builds a more resilient ecosystem.

Diversification.

We all know that in agriculture, monocultures don't make sense. Growing just one variety of crop means that it is vulnerable to disease, and doesn't replenish the soil or support the vibrant ecosystem of bird and insect life that keeps crops healthy and the soil fertile. If

you are dependent on one crop, you are vulnerable if the price of your crop crashes, or demand for your produce fails. We need a variety of plant and animal life that supports and nurtures the whole system, making it resilient.

It's the same with money. If we rely on just one form of money, and a form of money that we don't control, we are vulnerable to pathologies in that form of money and to the supply of it drying up. That is not resilient. We might find that it does not nurture parts of our community that we value. It may be good for setting up businesses, but not for valuing the environment, community and conviviality. It may create wealth, but puts us on a treadmill. Just as we need diverse agricultural ecosystems, so we need a diverse financial ecosystem.

In Cities and the Wealth of Nations, Jane Jacobs explained that a national currency like the British pound, or even worse a continental currency like the dollar or Euro, means that a local economy does not have the economic tools it needs to manage its economic future, or respond to changing economic conditions.

Alternative currencies help to transition our local economies and develop ways to make our livelihoods enjoyable, sustainable and resilient in a number of ways. Alternative currencies help us mobilize the hidden skills, time and resources of our community.

- Peter North, "[Local Money](#)"

Something else is going on when bank-created credit is used as a medium of exchange. Traditional employment receives money for helping expand the monetized realm. We find that in order to earn money, we must participate in the conversion of the good, the true, and the beautiful into money. That is because of the money system—credit ultimately goes to those who can most effectively create new goods and services (or take it from those who create them). An interest-based money system exerts a systemic pressure to convert the commonwealth into money, and the highest remuneration goes to those who do that most effectively. You want to get rich? Invent a way to chop down trees more efficiently. Create an advertising campaign that persuades other nations to drink Coke instead of indigenous beverages. Seeing the workings of the global economy, many idealistic young people decide they want no part of it. I get letters from them all the time. "I want no part of this. I want to do what I love in a way that hurts no one. But there is no money in that. How do I survive?" How do you survive, not to mention access the large amounts of money to do great things, in a world that rewards the destruction of the very things you want to create?

- Charles Eisenstein, "[Sacred Economics](#)"

Our national currencies are but one form of money. Just as no single tool can build a house, no single type of money, no matter how ingenious or robust, can be designed to address each and every one of the many and sometimes divergent requirements of society. Moreover, given the particular architecture of our current money, with its artificially maintained scarcity, there will never be sufficient sums of national currency available to meet our many and ever growing demands. A one-type-fits-all monetary design makes as much sense as artificially limiting our use of tools to hammers when so many other specialized tools are readily available for practical use right now.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Money, the codified agreement that circulates throughout our global economic network, is maintained as a monopoly of a single type of bank debt, fiat-based, interest-bearing currency. The technical justification for this monopoly is to optimize the efficiency of price formation and exchanges in national and international markets. Massive legal and regulatory mechanisms are in place to ensure and maintain this monopoly, mainly through the requirement that only national currencies are acceptable as legal tender for payment in taxes.

The current monetary paradigm is, in effect, equivalent to a planetary ecosystem where only one single type of plant or animal is tolerated and artificially maintained, and where any diversity is eradicated as an inappropriate competitor because it would reduce the efficiency of the whole. Only one end result is possible in such a scenario—the collapse of the system as a whole.

The solution that leads toward monetary sustainability defies conventional economic thinking, which mistakenly assumes monopolies for national currencies as a given. Sustainable ecosystems demonstrate that flow systems require sufficient diversity and connectivity at different scales covering all levels. A monopoly of one type of centralized currency, particularly one that requires artificial scarcity to maintain its value, is not compatible with such a role. A monoculture of bank-debt national money may have been appropriate—perhaps even necessary—for an industrial-age world to emerge. But this paradigm is without question far too limited for a 21st-century pluralistic society seeking innovative, sustainable, postindustrial economic solutions.

Complementary currencies improve the resilience of the whole economy by providing greater diversity in exchanges; they enable transactions that otherwise wouldn't occur, through connections that otherwise wouldn't exist. Though traditional economics tends to dismiss the contributions of complementary currencies on the grounds that they are less efficient, systems thinking demonstrates the fundamental flaws in that

argument. Though complementary currencies may reduce overall efficiency, they increase resilience and engender a more sustainable economy. When diverse types of money reach every level of society, a richer socioeconomic fabric is inevitably woven that is far more pliant, able to better withstand and deal with multiple contingencies and changes to the environment. The system thus becomes more stable. This is the structural lesson of natural ecosystems.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

A structural solution requires creating a monetary ecosystem with diversity in terms of means of exchange and types of issuing institutions, including the government. If the objective is to create diversity, the most logical step is not to get rid of the one large-scale system already in place.

- Sally Goerner, Stefan Brunnhuber, Bernard Lietaer, and Christian Arnsperger, [“Money and Sustainability”](#)

Single National Currency = Money Scarcity = Artificial Scarcity (The Deficiency of Money Is Man-Made, Artificial and Disconnected from Reality)

The point is that having a single national currency (legal tender) per country creates **artificial scarcity** and **ruins it for everyone**, directly and indirectly.

More forms of legal tender or means of exchange means more opportunities for exchange of value in healthy ways and elimination of artificial scarcity and environmental destruction.

*... the general deficiency of money in circulation. This is especially true during periods of "recession." But even under normal economic conditions, the customers of a particular type of business may have their buying potential restricted because their disposable income is not keeping pace with inflation. **This deficiency of money in circulation derives generally, not from any inadequacy in the resources or productive capacity of the local economy, but rather from the workings of remote agencies**, including the Federal Reserve Board, the federal government, large commercial banks, and transnational financial institutions such as the World Trade Organization (WTO), the World Bank, and the International Monetary Fund (IMF). These agencies, which are closely interlinked and often act in consort, hold tight control over the supply of money and the allocation of financial resources. By their policies, which they pursue in their own interests, they can stimulate or strangle both national and local economies.*

...Lack of money is the usual reason given for problems not being addressed. Yet, as described earlier, official money is kept purposely scarce in the mistaken belief that scarcity is what gives money its value. As a

result, the official monetary system does not provide an adequate supply of money to allow for a fair distribution of the products of the economy, or even to provide everyone with a subsistence level of income. Monetary scarcity also makes it possible for money to be “lent” at high rates of interest and enables those who control its creation to determine the course of the economy and the financial fate of the people. The tragic result is that important work remains undone and human needs often go unmet because of the lack of money. This scarcity is felt most acutely at the margins of society, by those who are less well connected and whose skills are least valued by the market economy. Their numbers include an ever growing proportion of young people.

This situation can, and must, be remedied. As shown throughout this book, money is a human creation. It is just a medium of exchange. Why should money ever be too scarce to match idle workers with work that needs to be done? We can restore the integrity of our local economies, which will, in turn, go a long way toward solving our social and environmental problems. As argued throughout this book, one way to do this is to create our own local medium of exchange to supplement scarce national currency. This has been done many times before, and it is being done now in many places around the world. A local currency can provide the means of connecting buyers and sellers who would otherwise be kept apart by lack of money.

- Thomas Greco, “[Money](#)”

Are We Putting the Cart Before the Horse?

The official monetary system puts the cart before the horse in that money must be obtained before a purchase can be made. Whether that money be in the form of paper, coins, or bank credit, its creation is beyond the control of the producers of real wealth. In other words, the creation of goods and services depends on money changing hands. Zander's proposal is much more rational. It puts the horse properly before the cart, in that producers can create a form of money themselves with which to enable others to purchase their products. In this instance the creation of money depends on goods or services changing hands.

- Thomas Greco, "[Money](#)"

In today's world, credit is the substance of money and the means of payment. Precious metals no longer play a monetary role. But credit is monopolized by a banking cartel that keeps it scarce. As Riegel put it, "The political money system starves productive enterprise but finances lavishly the destructive activities of war."

- Thomas Greco, "[The End of Money and the Future of Civilization](#)"

When we get to look at DeFi and Complementary Currencies below, we will see how this problem is solved permanently and practically.

Another Grave Yet Relevant Warning from History (This Time from The Middle Ages)

The icons of old are the coding of tomorrow. And tomorrow holds the promise of recovery of forgotten wisdom.

- Jean Houston

The following story blew my mind.

I discovered it in the book "[New Money for a New World](#)" by Bernard Lietaer and Stephen Belgin. I encourage you to get a copy of this book. It's really good.

Here is that mind-blowing story (it is about a period in history that had true prosperity for all, and how that happened):

Historical evidence informs all our social, cultural and economic knowledge. In economics, however, it is only very recent data that tends to be considered, based on the assumption that experiences from past ages are not relevant to contemporary economic issues.

Yet, our banking and monetary systems have remained fundamentally unchanged for centuries. Failure to examine the more distant past prior to the inception of the current paradigm risks overlooking potential insights useful for today.

One historical period of particular relevance is explored herein.

THE CENTRAL MIDDLE AGES

Once upon a time, there existed an age blessed by an uncommon prosperity that enriched each segment of society. There was work for all, with favorable working conditions and abundant time for family, community, and personal pursuits. This epoch was also characterized by significant advancements in science, technology, education, literature, music, arts, craftsmanship, and more. Its ethics included cooperation, an unusual civic pride, and long-term thinking. The many unusual traits of this period culminated as well in the creation of some of the most beautiful and enduring public works the world has ever known.

Though seemingly like some fairy tale, this age not only existed, but endured for centuries. It flourished in the very same region from where our current monetary and banking systems originated—Western Europe. It came into being, however, long before the advent of our present monetary paradigm and the modern era. A millennium hence, this bygone age offers unique lessons for us today.

The Middle (or “Medieval”) Ages were so named because this time period was the expanse of European history in the “middle” of the high civilizations of Rome (ending in the mid-400s CE) and the Renaissance (beginning in the late 1400s). This entire epoch is also commonly referred to as the “Dark Ages,” as popular belief regards this period as one of dismal poverty and primitive lifestyles, crowned by the horrific plague. The term medieval is still used today as a derisory label to dismiss something as hopelessly primitive.

Many of the opinions regarding this age, however, date back to 19th century assertions, which have since been proven to be incomplete or entirely mistaken. The Middle Ages spanned more than 1,000 years. Recent scholarship has unveiled key distinctions regarding what transpired over this long expanse of history.

A dismal view certainly remains justified for the epoch following the collapse of the Roman Empire—the Early Middle Ages (5th–8th centuries) —and is much more accurately descriptive still of the dramatic closing medieval centuries. It is in fact the particularly appalling Late Middle Ages (14th–15th centuries) that provided much of the fuel for the dark image that future generations would project, inaccurately, onto the vast entirety of the medieval millennium.

There were, however, two and one-half centuries during the medieval epoch when something quite different took place. This middle period is the “Central Middle Ages.”

Highlights of the Central Middle Ages

Toward the middle of the 10th century, a marked shift in consciousness paralleled dramatic economic improvements in many areas of Western Europe. The progress spanning 1040–1290 is noted by medieval scholars as the “First Modernization,” the “European Takeoff,” and the “True European Renaissance.” Between 1180–1230, for instance, the first wave of universities was founded in Europe. Abstract sciences, such as mathematics, once thought to have developed in the official Renaissance of the 16th century, occurred instead centuries earlier during this period.

The Central Middle Ages were also characterized by a most unusual prosperity.

Prosperity for All

The prosperity of this era was quite unusual not only in quantitative terms, but also by the extent to which it benefited the general populace. A number of contemporary medievalist historians report that the quality of life for ordinary people in the 12th century may very well have been the highest in all of European history, comparing favorably in important respects even to present-day conditions. Workers, for example, seldom had fewer than four courses at lunch or dinner and enjoyed three or even four meals a day. Daily caloric intakes, estimated at 3000 calories in developed countries today, was instead 3500–4000 calories in the Central Middle Ages.

Working hours were limited as well. When the dukes of Saxony tried to extend the workday from six hours to eight, workers in the region rebelled. Sunday was the “Day of the Lord” and the appointed day for public matters, while the so-called “Blue Monday” was designated as a free day, set aside for the general public to attend to their private affairs. In addition, there were at least 90 official holidays annually. In some regions, there may have been as many as 170 holidays in a single year!

In addition to favorable working conditions, the working class also enjoyed a remarkable level of economic independence. As medieval economic historian Guy Bois explains: “In the agricultural sector, for the first time the small landowners as a group become much more productive than the Seigniorial holdings. In short, Europe becomes more and more a world of small producers with the family unit as its fundamental engine.”

A number of medieval historians offer testimony to the expansion and improvement that took place in virtually every dimension of Central medieval society. Medievalist Marcel Bloch claims that increased private ownership is accompanied by “the largest increase in cultivated agricultural land in the entire span of the historical record.” Guy Fourquin reports: “not only did the land available expand, but also the average yields more than doubled in most cases.” F. Icher writes: “Between the 11th and 13th century, the Western world experiences a high level of prosperity that is reflected concretely by a demographic expansion

without precedent in history.” Between 1000 and 1300, Europe’s population is generally estimated to have increased an unprecedented twofold, one expression of the increased capacity to feed and maintain the population. Moreover, as Guy Bois writes, “Growth isn’t limited to a demographic explosion combined with a strong agricultural expansion. A flourishing commercial expansion was its third dimension.”

Medievalist Jean-Pierre Bayard reports that, “ordinary life is revolutionized: coal is used for heating, candles for lighting, eyeglasses for reading, glass is used more and more commonly, paper is manufactured on an industrial scale.” Robert L. Reynolds writes, “[There is] a growing manufacture of textiles, pottery, leather goods, and many other things. The products get better and better. Prices go down in terms of man hours because of more efficient management, improvement in tools and machinery, and better transport and distribution.” According to medievalist R. Phillippe, at the beginning of the 12th century there were in operation in France alone no fewer than “20,000 water mills, which represented the energy of 600,000 workers. Such technologies liberated massive amounts of labor.”

Urbanization, previously thought to take off with the Industrial Revolution of the 1700s, began during the Central medieval period. Frances and Joseph Gies write, “Europe was turning from a developing into a developed region. The growth of industry meant the growth of cities, which in the 12th and 13th centuries began to abandon their old roles of military

headquarters and administrative centers as they filled with the life of commerce and industry.” Robert Lacey and Danny Danzinger report that “Warwick, Stafford, Buckingham, Oxford—most of the county towns of modern England originated in the tenth century.”

Guy Bois summarizes:

One can only be impressed by the extraordinary vitality and power of the changes that occurred during those three centuries. Whether one considers the demography, the urbanization, the techniques, the relationships between labor and money, every one of these aspects of society was completely revolutionized...One will have to wait five hundred years to live another wave of transformation of that scale: the capitalist Industrial Revolution.

Heights

Confirmation of the unusual prosperity of this age comes in an equally unusual form of physical evidence: bodily remains.

It is well known that today’s generation is substantially taller than the previous one—better nutrition and care, particularly in youth, is credited with this process. In a study of the skeletons of bodies in the same geographical area—London—informative findings emerged. The women of London were taller on average during the 10th–12th centuries than any other period in recorded history, measuring a whopping 7 centimeters taller than her Victorian counterpart and

even 1 centimeter taller than today! Regarding males, it is only within the past fifty years that they have caught up to and, by 1998, finally outgrown their medieval counterparts, by a mere two centimeters (see Figure 6.1).

The increased height of Londoners of the Central medieval period appears to reflect the greater quality of life for men and women of that epoch.

Age of Cathedrals

This medieval epoch has also been referred to as the “Age of Cathedrals,”¹⁰⁶ as nearly all of the cathedrals of Europe were built at this time. Historian Sacheverell Sitwell writes, “It was the greatest period of building activity that there has ever been, and no mere catalogue of names and places can convey any idea of the strength and quality of its products.”

It is estimated that by 1300 CE there were almost 1,000 cathedrals in Western Europe, alongside 350,000 churches and several thousand large abbey foundations. Yet, the total population back then is estimated at only 70 million, which calculates to an average of one Christian place of worship for every 200 inhabitants. The ratio was even higher in parts of Hungary and Italy: one church for every 100 inhabitants!

This medieval building phenomenon is more remarkable still given that there was no central authority, church or otherwise, in charge of initiating or

funding the construction of these cathedrals. Contrary to popular belief today, these structures were neither built by nor belonged to the church or nobility. Local nobility and royalty customarily did make contributions, but these monuments were typically owned and financed by the citizens of the municipalities where they were built.

The cathedrals embody some of the most beautiful gifts of Western history. These monuments stand as a strong statement of faith, ingenuity, and generosity. From a narrower economic viewpoint, they also offered a viable long-term income strategy for the community (see insert).

Cathedrals: an Investment Forever

Besides their symbolic and religious roles, the cathedrals served another key function. Attracting currency into a community has clear economic advantages, as those living in proximity to today's tourist attractions such as Disney World will confirm. In medieval times, this was realized by attracting pilgrims, who played a similar economic role to that of today's tourists. A proven way to draw pilgrims was to build the most accommodating and spectacular cathedral in the area, which may help explain why medieval communities built cathedrals that could house two to four times their own population.

Additionally, these cathedrals, which were built to last forever, created cash flow not only for the population of the time, but for many future

generations. The bulk of the businesses in Chartres, France, for example, still thrive today from tourists coming to visit its medieval cathedral 800 years after its construction.

Few medievalists today doubt the extraordinary economic and building boom of the Central Middle Ages. One fundamental matter, however, remains unresolved: “The medieval blossoming has been described many times in its manifestations, its chronology, and its many facets, but never explained. Its mechanism remains an enigma.”

The economic mechanism that justified the remarkable blossoming of that period remains unclear. Where did the resources come from to fund hundreds of building projects on the scale of cathedrals? Faith and devotion alone cannot explain this construction any more than they can explain the remarkable prosperity of the ordinary people.

One medieval feature has, however, gone almost entirely overlooked— the monetary system. This previously ignored element may help explain the peculiar dynamics of that period.

The Invisible Engine

Two different types of currencies functioned in parallel to one another throughout much of Western Europe during the Central Middle Ages. One type of currency consisted of centralized royal coinage, with many features in common with present-day national

currencies. Its usage was primarily for long-distance trading and for the purchase of luxury goods. The second type of currency consisted of an extensive network of different local currencies, used primarily for community exchanges.

Many of the local currencies had a very peculiar feature—a demurrage charge. Similar to a negative interest on money, the demurrage feature functions like a parking fee, which is levied for holding onto the currency for too long without spending it.

The demurrage was implemented through a general recoinage practice, enacted during the transfer of power to a new lord, usually due to the death of one's predecessor. As a rule, four old coins were handed in and exchanged for three new ones, each with the same individual value of the coins that they replaced. This tradition, called "renovatio monetae," amounted to a 25 percent tax payable by anyone in possession of dated coins at the time of recall. The uncertainty about the duration of a lord's life (and thus, the functional lifespan of the currencies) acted as an incentive for users to spend or invest rather than save such coins.

In technical terms, when demurrage is applied, money continues to function as a "medium of exchange" but no longer serves as a "store of value," that is, something worth hoarding. Though saving was very much encouraged, it was not done by storing currency, but took the form of productive assets. Examples of such investments were land improvements or high-quality maintenance of equipment such as

water wheels and windmills, or enduring investments in the community such as the cathedrals. The specifics of how demurrage was applied differed from region to region, but generally speaking, provided a built-in incentive to invest in this way.

Written records from the period offer testimony to the benefits of this kind of savings. A significant number of mills, ovens, winepresses, and other heavy equipment were improved upon or even completely rebuilt each year. “They did not wait until anything was breaking down...On average, at least ten percent of all gross revenue was immediately reinvested in equipment maintenance.” No other period since then has encouraged such intensive preventive maintenance.

In effect, a pattern of longer-term investments became the norm rather than the exception. For those with demurrage currency to spare, investing in the cathedrals was likely an ideal way of demonstrating one’s faith while also providing benefits for the community. The medieval cathedrals, still standing today and continuing to receive visitors from around the world, are enduring testimonies to the long-term vision of that former age.

Demurrage-charged complementary currencies also help to explain the particular Central medieval economy. Given that savings were inherently discouraged by demurrage, these currencies would remain in circulation and were exchanged with far greater frequency at all levels of society, in contrast to other forms of money. The greater velocity of

circulation (a higher frequency of transactions with the same given coin) enabled the less- privileged classes to engage in substantially more transactions, which significantly improved their standard of living.

THE END OF AN AGE

This Golden Age came to a brutal end at the closing of the 13th century. The plague, otherwise known as the Black Death, is customarily blamed for causing the misery that subsequently befell Europe. Recent findings tell another tale.

Though usually cited as the cause of the later medieval horrors, the outbreak of the plague did not occur until 1347–1349. Yet, the population started plummeting two generations beforehand. Mostly overlooked is the fact that the Black Death was preceded by decades of economic and social devastation.

A major economic crash occurred during the period of 1280–95. A majority of the population, urban as well as rural, ended up being reduced to living at subsistence levels in the last decade of the 1200s. The economic downturn was then followed by widespread famines, epidemics, and extensive loss of life from 1300 onwards, decades prior to the outbreak of the deadly pestilence. From 1315–1322, the noted Great Famine took place. Historian Henry S. Lucas estimates that hunger killed ten percent of Europe's population.

Accounts from the period describe the severity of conditions: “So many men and women died every single day from all social classes—wealthy, middle class and poor—that the priests couldn’t bury them fast enough, so that the stench in the air was everywhere.” A London chronicle reported that, “the poor people ate for hunger cats and horses and dogs...Some stole children and ate them.”

Again, all these events took place decades before the first outbreak of the plague. Historian Daniel Power writes, “One needs, I believe, a lot of blindness to describe the outbreak of the Black Death as an accidental and exogenous event. Isn’t it most surprising that this disaster happened only after 60 or 70 years of total misery?”

It is now known that more than a half century prior to the plague, disastrous monetary changes were implemented.

Political and Monetary Changes

A historic power shift occurred in Western Europe during the 13th century, whereby the doctrine of “King by Divine Right” was taken to its extreme. Local governments and administrations were overrun by strong, rapidly growing central authorities with commanding kingdoms and large armies. The dual currency system was abolished and replaced by the imposition of a monopoly of royal coinage. King Louis IX of France specified that only royal mints had the right to issue coins in the realm.

Though it would take several decades, the elimination of local currencies eventually became sufficient for the monetary contraction to have an overall economic impact.

The final kiss of death to the “good” monetary period in Central medieval France came in 1294–98 when, in preparation for war, King Philip IV, resorted to the debasement of royal money to meet his urgent income requirements. Debasement is a process in which the precious metal content of a coin is significantly reduced. By taking this expedient debasement road, and by doing so on a huge scale, Philip IV set into motion severe inflation and economic disaster.

In practical terms, these monetary changes of centralization and debasement resulted in a double economic hit—monetary contraction followed by inflation. With the abolition of the local currencies, there was now complete dependency on the official, centrally issued coinage. The debasement in the late 1290s resulted in massive inflation. Existing contracts or monetary agreements became, in effect, meaningless. A modern parallel would be the Great Depression of the 1930s, in which the money supply shrank, followed immediately by hyperinflation, as occurred in 1920s Germany and in 1970s Brazil.

The medieval economic crisis led to a general societal breakdown and decades of famine and death. The physical weakening of the population was sufficiently extensive to render conditions ripe for the plague to become one of the worst pandemics in all of

history. The Late Middle Ages that followed were indeed dark.

As Guy Bois explains: “This depression would be a long one—it would last one and a half centuries; it would be painful to a degree that we still have difficulty imagining. No aspect of social life would be protected from this collapse.”

Although a few local currencies managed to survive until the 18th century, the medieval experiment with complementary currencies would not be repeated on such a scale. Complementary currencies never again reached the critical mass needed to significantly impact the standard of living of Western society.

Twice and Thrice Upon A time

Support for the role played by monetary paradigm in the realization of this Golden Age, as well as its demise, is offered by a nearly identical scenario found in another ancient civilization—Dynastic Egypt.

Egypt enjoyed one of the highest standards of living of the ancient world. Its economy afforded Egypt the capacity to be the first known civilization to offer assistance in the form of foreign aid to other societies. Like its medieval counterpart, Egypt had a dual monetary system, with long- distance currencies much like our own national currencies, together with demurrage-charged local currencies that enabled local exchanges among the working classes. Unlike the Central Middle Ages, however, Egypt’s economy and

dual monetary system endured not hundreds but thousands of years. The end of this age, like that of medieval Western Europe, coincided with the introduction of a currency system similar to today's national currencies, which was imposed on the Egyptians by the conquering Romans.

Another example of an unusual economy and monetary system that dates back to the medieval period, but which continues in part to this very day, is found in Bali. Though its monetary system has undergone changes in recent decades, Bali maintains at least some of the traits found in Central medieval Europe and Dynastic Egypt. The economies, monetary systems, and societal conditions of Bali, the Central Middle Ages and Dynastic Egypt offer important insights about how we might improve conditions in our world today, and are therefore the subject of further investigation in Part IV of this book.

CLOSING THOUGHTS

The complementary currencies of the Central Middle Ages came and went without any awareness of their role in shaping the investment patterns that created a Golden Age. Yet, when local currencies disappeared, cathedral building also stopped. What changed? It wasn't people's faith: there is no evidence that Europeans were less devout in the 14th century than in the 12th.

In this light, the Central Middle Ages revealed two important characteristics of money: its value-

nonneutrality and its potential for addressing large-scale social issues. It is only a millennium after the fact that are we beginning to understand how local currencies, particularly those using demurrage, induced long-term investment and cooperative behavior patterns that benefited both the local economy and the entire population, regardless of socioeconomic levels.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Interest Charged in Debt-Based Privately-Owned Monetary Systems Creates Artificial Scarcity and Transfers Real Assets from The Public and Into the Hands of The Monetary System Owners

When the bank creates money by providing you with your Pound 100,000 mortgage loan, it creates only the principal when it credits your account. However, it expects you to bring back Pound 200,000 over the next twenty years or so, if you don't, you will lose your house. Your bank does not create the interest; it sends you out into the world to battle against everyone else to bring back the second Pound 100,000. Because all the other banks do exactly the same thing, the system requires that some participants go bankrupt in order to provide you with this Pound 100,000. To put it simply,

when you pay back interest on your loan, you are using up someone else's principal.

In other words, the device used to create the scarcity indispensable for a bank-debt system to function involves having people compete for the money that has not been created, and penalizes them with bankruptcy whenever they do not succeed.

The interest rate decisions of central banks get our attention, and this is one of the reasons. The additional cost of increased interest results automatically in a proportional number of increased bankruptcies in the near future. This takes us back to the time when the high priests had to decide whether the gods would be satisfied with the sacrifice of only a goat - or require the sacrifice of the firstborn son instead. Lower down on the totem pole, when your bank checks on your creditworthiness, it is really verifying whether you are capable of competing and winning against the other players, i.e., managing to wrestle out of them something that was never created.

In summary, the current monetary system obliges us to incur debt collectively, and to compete with others in the community, just to obtain the means to perform exchanges between us.

A third systematic effect of interest on society is its continuous transfer of wealth from the vast majority to a small minority. The wealthiest people and organizations own most interest-bearing assets. They receive an uninterrupted rent from whoever needs to

borrow in order to obtain the necessary medium of exchange. The best study on the transfer of wealth via interest from one social group to another was performed in Germany during the year 1982, when interest rates were at 5.5%. All Germans were grouped in ten income categories of about 2.5 million households each. During that one year, transfers between these ten groups involved a gross total of DM 270 billion in interest payments received and paid.

- Bernard Lietaer, "[The Future of Money](#)"

50 Shades of Financial Exclusion

Am I Financially Excluded Without Even Knowing I Am?

"Everyone benefits from an economy that includes everyone. Yet today, billions of people—particularly in the world's poorest countries—are excluded from a formal economy and miss out on the many advantages these financial systems offer. We need to change this. And thanks to the rapid rise of digital payment systems, as well as the ubiquity of mobile technology, we now have the power to build upon existing infrastructure within individual countries to address this inequality. If we do, it's in everyone's best interests. It will help billions take a step toward financial stability and advance the goals of those in a position to make a difference."

- The Level One Project (Bill & Melinda Gates Foundation)

According to "[The New Confessions of An Economic Hitman](#)" by John Perkins ...

1% of Americans received 95 percent of all the wealth created since the depression was officially pronounced as ended in 2009, while 90 percent of Americans actually became poorer.

For every \$ 1 billion of wealth created, the average US citizen gets only \$1 dollar. Globally, 85 individuals own more resources than half of the world's population.

And now the question you must ask yourself, very seriously, is:

"Am I financially excluded or marginalized, without even realizing it?"

Financial exclusion is usually defined as people who are unbanked. People without a bank account.

I'd like to suggest a different perspective, one that sees it as a spectrum of inclusion, rather than a binary one:

- **System Owners:** Banks print their own money at will and at scale, out of thin air, without working for it
- **Financially Included:** The "Inner Circle" and very high net worth individuals and companies. They have full access to financial instruments the rest of the world has zero access to. They can make money out of thin air, to an extent.
- **Financially Marginalized:** System Users. The average citizen. Has access to mass-market financial instruments like basic bank accounts. All the money they get must be worked for, mostly on an hour basis. Exchange time for money. Don't have access to the more powerful tools like the big boys do. E.g., endless cheap debt, bailouts, derivatives, etc. Also, banking services relatively expensive and very slow, taking hours or even days or weeks.
- **Financially Excluded:** The unbanked.

The capital market in the traditional financial system is not accessible by many-only the rich have the VIP card to access it.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

Now, let's look at the people who are completely excluded. The outlook is shocking.

Lack of Identities (And Other Identity Problems), KYC & AML Laws, And How That Permanently Excludes 1/7th of The World's Population from The Financial System (Hey! What About the Pandora Papers?)

"Nothing else works without identity."

- Eric Jennings, Filament's cofounder and CEO

KYC = the legally mandatory process of identifying and verifying a client's identity. Today, with CeFi (centralized finance), you CANNOT get a bank account, or conduct financial operations, without proving your ID. KYC is part of a broader set of laws called AML.

AML = Anti-money laundering (AML) refers to the laws, regulations and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income.

Tragedy = According to the World Bank²¹, [more than 1 billion people \(1/7th of the world population\) have no ID](#). They are completely undocumented. No government has or is willing to issue them with ID. Good people. Not criminals. But good people who just happened to not have received a birth certificate, or who ran away from a war without documents. Or whatever. So, they are **permanently excluded from the current financial system!** WTF!

Does that sound reasonable and fair to you? That 1/7th of the world's population should be permanent excluded from the financial system, because of lack of ID? Through no fault of their own?

KYC and AML have their benefits, but not if they end excluding the undocumented and therefore unbanked. Permanently.

The excuse given by officials is that by allowing people without ID to participate financially, it will allow criminals and money launderers to also participate.

I have two questions regarding that:

1. Are these 1.1 billion undocumented people all criminals and money launderers? No. Maybe less than 1% are. So why should 99% suffer just so that 1% can be prevented from committing petty financial crimes? And isn't the very act of excluding them making them poorer and more desperate, and hence possibly driven to crime out of necessity to just survive?
2. What about the Pandora Papers? If you haven't heard about this massive scandal, it is the one about authorities, politicians, and high net-worth individuals and companies worldwide have been committing financial crimes on a grand scale, literally robbing

²¹ <https://www.worldbank.org/en/news/press-release/2017/10/12/11-billion-invisible-people-without-id-are-priority-for-new-high-level-advisory-council-on-identification-for-development#:~:text=WASHINGTON%2C%20October%2012%2C%202017%E2%80%94,are%20children%20who%20are%20unregistered.>

nations of billions, evading taxes in the billions, laundering money in the billions, and so on. And yes, they have identities, but the KYC and AML regulations didn't do a damn thing. They only punish the weak and poor. One cannot fail to see the hypocritical tragic irony that is the Pandora Papers. Here are some Pandora Papers links:

- <https://news.bitcoin.com/while-politicians-worldwide-clamor-over-tax-evasion-pandora-papers-show-bureaucrats-are-worst-offenders/>
- <https://www.theguardian.com/news/series/pandora-papers>
- <https://www.wired.co.uk/article/pandora-papers-leak>

By the way, the unbanked people of the world number more than **2.5 billion people.**

36% of the world's population!²²

Some due to lack of ID, and some due to banking services being too expensive for what they earn.

And while many are in developing countries in Africa and so on, millions are in developed nations, including the USA. The Federal Reserve estimated there are 55 million unbanked or underbanked adult Americans in 2018, which account for **22 percent of U.S. households.**²³ This pattern is repeated in the UK, France, China, and many of the richest nations in the world. It is a global problem, not an "Africa problem". Imagine how much safer and strong the whole world would be if everyone had Universal Access to Basic Finance, regardless. No excuses. We would all benefit. The whole is greater than the sum of the parts.

According to the World Bank's Global Findex Database, two billion people around the world are

²² <https://en.wikipedia.org/wiki/Unbanked>

²³ <https://en.wikipedia.org/wiki/Unbanked>

unbanked. The Center for Financial Inclusion reported that the lower 40 percent of the population in emerging economies constitute \$3 trillion in annual spending and disposable incomes continue to rise. In total, the financially excluded make up a \$380 billion market revenue opportunity for institutions that can find a way to provide services efficiently and inexpensively.

- Rachel W. Robinson, Blockchain Serving the Unbanked, Blockchain Research Institute²⁴

Are you starting to see just how ridiculous and selfish this system is? To drive home the plight of the unbanked, see this talk given by [Andreas Antonopoulos, on Universal Access to Basic Finance, on June 12th 2019, in London.](#)²⁵ I highly recommend that you [watch the talk](#), but if you cannot do that right now, here is the transcript:

The World Bank defines unbanked as the two and a half billion people who have absolutely no access to financial services and live in cash based societies.

Conveniently, they only count heads of household, meaning the spouses and children are unimportant in this calculation. Only the primary earners matter. And yes, we know that in the vast majority of the world

²⁴ <https://www.blockchainresearchinstitute.org/>

²⁵ <https://www.youtube.com/watch?v=Pkgo05Hdnfg>

finances controlled by women. They're not counted as the head of household.

To be unbanked is not to simply have only access to a cash based society. To be unbanked is to lack connectivity to the world. It's the lack of the ability to participate in trade and commerce, to be able to get a job that connects you with other people who want your services around the world, to build a future for your children. It is to be condemned to poverty. And when we look at that, what do we think?

They don't have money. That's why they're unbanked, wrong?

Absolutely wrong. They don't have access! They don't have documentation! They don't have the necessary literacy to fill in an application form. And sometimes they don't have the clothes or the shoes, or the appearance to even be able to enter a bank without getting kicked out by the security guard. That's what it means to be unbanked. And what does that do? It creates enormous poverty around the world, just so we can persist in this petty bourgeois idea that as long as we have every participant in every transaction prove their identity, and we can track and control every transaction through this totalitarian surveillance system, we will end crime.

And in order to believe in that false idea of safety through totalitarian control, we condemn billions of people to poverty. Billions of people, not two and a half billion. Many, many more. We talk about financial

inclusion from the perspective of the rich and privilege world we live in the world I live in. As an American citizen, I have access not only to open a bank account, but also to trade in multiple currencies without restrictions, access to unlimited investment opportunities all around the world, access to capital, liquidity and credit, the stability of a currency that doesn't destroy itself overnight, taking my entire savings with it. And hopefully, most of the time, access to institutions that are not actively stealing my money, or governments that are not actively destroying the currency in order to pay off their debt, through shadow inflation, hyperinflation, and then finally financial collapse. How many people have that? Everyone in this room probably.

But if you count all of the people around the world who have access to that kind of financial service, it's maybe a billion and a half. And that's why after 2013, I started saying strongly and loudly.

This is about the other 6 billion. That's what financial inclusion means.

Our regulatory system is actively excluding people from access to finance. We have finally reached a point where access to the most basic financial services has become a privilege. A privilege that the average person has to exercise this dance have proven themselves worthy in front of a banker, filling in reams of paperwork and application forms in order to be granted the privilege of financial services.

And we even turned around and condemned cash. The ultimate peer to peer anonymous fungible mechanism that for millennia, has provided financial services to everyone. Basic financial services. And cash has one fatal flaw. And it's not that it's anonymous, that its greatest feature. And it's not that it's used by criminals, criminals get a banking license and defraud people by the millions. Its greatest feature is that it is available to everyone without vetting. Its greatest feature is that it is an open, transparent, neutral, verifiable, peer to peer transactional system. And its greatest weakness is that it is constrained by geography and locality. It doesn't have range and scale.

And now we have a new form of digital cash, which is also open. And it's also neutral and verifiable, unforgeable, transportable, but this one is borderless, it's censorship resistance. It can be used even when your government doesn't want you to use it. It can be used without privilege, without identity. And it can be used everywhere in the world by whoever wants to use it by simply downloading the software and running it on whatever computing device they can afford. That is the real revolution here.

And while we're having a little privileged discussions about should we regulate crypto, how much should we regulate crypto, who should regulate crypto, fuck that. Crypto is about providing universal basic finance to whoever needs it everywhere in the world, whether we like it or not.

And what will people do with universal basic finance? What they've done for millennia with access to cash, they will build a future for their children. We are paralyzed by the fear of a few bad actors. blinded by the fact that the worst actors are the ones who act with state privilege and endorsements with the intelligence agencies hand-in-hand inside the surveillance capitalism mechanism to fund dictators and drug lords all around the world with our tax money to the tune of trillions.

The real terrorism, the real drug financing doesn't happen in cash. It happens in millions of barrels of oil, and billions of pallets of dollars transmitted through wire transfers by the banks who get caught again and again and again and again. And they pay a fine, that is a fraction, not only of the criminal behavior that they profited from, but of the tens of thousands of deaths they've directly contributed to, and not a single person goes to jail.

And at the same time, some people have the audacity to say that we need to end cash in order to stop crime. How magnificently self righteous.

In the United States, 18% of the population does not have access to banking services that 60 million people. I recited this fact, at a banking conference, and one lady in the back raised her hand and said, Why should we give illegals bank accounts? That's a chilling statement to make. Let me translate it to you in words that will make more of an impact. 'Those people don't deserve the privilege of financial inclusion. Those people.' When

your neighbor says 'those people' don't belong in our neighborhood, it freaks you out because you suddenly realize you're living next to a bigot. But when a banking regulator says 'why should we give illegals a bank account?' I calmly responded, 'you shouldn't, we will'.

At the last conference I attended, after I gave a speech decrying the lack of security and financial inclusion, a young man came to me and said, 'this really spoke to my personal story'. That young man in his 20s has been living in western and developed countries for the past 15 years, has not been able to open a bank account in 15 years. 'Every time I write my name and place of birth in the application, the process has already ended. I was born in Iran. I didn't choose that. I didn't do anything. I pay my taxes. I have a job. All I want is to deposit my paycheck in a bank account, so I can buy groceries. For 15 years I've been unable to do that.'

That is the face of the unbanked. There are people walking the streets around you in the city of privilege, in the independent district of the city of London, bought and paid for by banking corporations, in this little enclave that is the Vatican of capitalism, a city within a city, people walking around you, invisible people, your janitors, your service professionals, the people making you a sandwich, who don't have a bank account. Who take their paycheck in cash. And they go to various places in order to ask for payday loans. Maybe they take a check or other form of payment they can't deposit. And they get charged 10 or 15% or 30% to send money home to their loved ones. So they can support a basic life and subsistence. That's the

unbanked. They are right here in this city. Don't imagine the great masses of Africa, of course, they're unbanked. Or Southeast Asia, or South America. Right here, your neighbors. And they have been made to live in that position just so we can continue this illusion that safety comes from totalitarian surveillance.

Right now, the world governments are trying to abolish cash, they're trying to abolish the very last Lifeline that remains for the billions of people who have a life of poverty, not because they don't work, they work harder than all of us, not because they don't deserve but simply because of where they were born, or what documentation they have, or what level of literacy they have, or even how they look....

*But most importantly, when we make these moral choices, we have to understand **surveillance never stopped crime. Surveillance is the license given to the people who are on the top of that, to control our lives.***

They will commit crimes, they will commit the worst of crimes, what I call mega crimes. And I know Britain doesn't use the metric system. So mega is the prefix we use for millions. And mega crime is one where, for example, you foreclose on a million homeowners and don't go to jail. That's a mega crime.

We're doing surveillance and analytics to catch a petty drug dealer who's selling pot for Bitcoin. Who's doing surveillance and analytics and Lockheed Martin, who's doing surveillance and analytics on the money

laundering banks? Nobody? Do you know why? None of them ever go to jail.

The regulators are completely captured, and the very system of controlling finance from above, by having levers of power over the lives of millions of people, billions of people, I've having the audacity to cut off entire countries and say, well, they're under sanctions. They're not privileged enough. They're not people enough to gain financial services. Guess who that attracts?

If you build leavers of power like that, the very worst sociopaths in our society are attracted like flies to shit, to grab hold of those levers of power, and destroy all of your freedoms as quickly as they can...

Let me end on a positive note, because you're probably a bit freaked out by all of this. You should be This is serious stuff. Open borderless public, transparent, neutral censorship resistant, strictly private cryptocurrencies exist. They will not be regulated. They cannot be regulated, not by committees, because they're regulated by mathematics. They're regulated by algorithms. They provide certainty of transaction. They provides programmable customer protection. They provide reputation management's. They provide access without identity. They give billions of people eventually, not just a bank account in their pockets, but a bank in their pockets. They democratize the function of banking, and turn it into an app that everyone can access without vetting, because they've already pre vetted. They have

*agreed to download the software that follows the rules of consensus, and that is the only vetting required in these systems. 'But we shouldn't allow that.' We did. 'But we can't have people make anonymous transactions.' They will. 'But we must regulate this.' You can't. And you won't. Because **6 billion people need this. And you have neither the moral authority, nor, more importantly, the practical capability to stand in their way, or even to stand in the way of what is going to be the greatest revolution in financial services in three centuries, universal access to basic finance.***

Thank you. Thank you.

Here's the thing: **you can't stop people who are already outside your financial system and firewalls**, from helping themselves using DeFi. The innovation will happen outside of your system and firewalls, beyond your ability to control. And in terms of numbers, these people number in the billions. So, I'd advising working with these people instead of against them.

The good news is that DeFi is able to:

1. Give full financial services to everyone, even those without any ID at all
2. For those with ID, it is able to secure their identity so that their privacy is not compromised. With DeFi, the system is able to verify your identity without forcing you to give it all your details like CeFi does. This is called "zero knowledge proof"²⁶. You no longer have to risk your privacy and personal data to use any services. And your data cannot be stolen or misused as it is today.

²⁶ <https://www.wired.com/story/zero-knowledge-proofs/>

Zero Knowledge Proof = a method by which one party can prove to another party that a given statement is true, without conveying any information apart from the fact that the statement is indeed true.

These solutions are already being built, for example, <https://humanity.co/>, <https://age-ify.com/>, and many others.

For more on this, see “[Blockchain Revolution](#)” by Don Tapscott and Alex Tapscott, and “[Token Economy](#)” by Shermin Voshmgir.

“Bitcoin would be convenient for people who don’t have a credit card or don’t want to use the cards they have.”

- Satoshi Nakamoto

Part II: DeFi. How To Build Monetary
Systems, Money, Currency, And
Financial Products & Services Using
Decentralized Finance

Finally! How To Build DeFi

Finally, we are ready to discuss actual DeFi.

“Writing a description for this thing for general audiences is bloody hard. There’s nothing to relate it to.”

- Satoshi Nakamoto

“If you don’t believe it or don’t get it, I don’t have the time to try to convince you, sorry.”

- Satoshi Nakamoto

Please note that DeFi is a very huge subject, and no single person knows everything about it. Furthermore, there are millions of very smart people, worldwide, inventing new aspects of DeFi literally daily. The speed of innovation is breathtaking.

So please manage your expectations about this book as follows:

1. This book is designed to give us an overview. It is not a detailed technical manual of everything DeFi (that would be impossible).
2. By the time you read it, some of what you find in here may already have changed, been improved upon, or been cannibalized by something even newer and better.
3. Give yourself time, have patience. This is a crazy new world, and no one gets it right away. It takes time. Just get into it and keep going, and things get clearer over time. Frustration is normal, feeling like you are missing something is normal. The gaps will fill as you keep going. And this book will not give you all the answers,

that is impossible. We are only aiming at an overview here, of the whole land.

Of course, I will not leave you hanging dry. I will make sure you know where to go to for details. To aid in that, I will be quoting extensively from various books, so you know which books to go.

With that, we shall start with this fundamental concept.

That DeFi is like LEGO.

DeFi Is Like LEGO

I am oversimplifying here, of course. But in a nutshell, just like with LEGO, with DeFi, you take a few parts and pieces from a wide variety of available ones, and you put them together to make something new.

Many pieces already exist freely, as open-source code on repositories like <https://github.com/>, or as platforms (like <https://solana.com/>) and applications, protocols and services (like <https://cloud.binance.com/> or <https://uniswap.org/>). Anyways, depending on what you wish to build, you select the most suitable pieces, and you put them together to make something new. In this book, I will try give you a general idea of the types of pieces available.

To build a new DeFi solution, you would:

1. Choose a suitable **Blockchain platform** (or in rare cases, create a new one). Blockchains are what are known as Layer 1. They are the foundation. Ethereum <https://ethereum.org/> or Solana <https://solana.com/> blockchains are an example.
2. If needed, choose an **optimization solution** to make transactions faster, cheaper, or to otherwise make the selected blockchain work better. These are known as Layer 2. The Lightning Network <https://lightning.network/> is an example.
3. Build your **application**. A DeFi application typically consists of three main components:
 - a. Tokens
 - b. Smart Contracts

- c. Oracles & Data Aggregators
4. Build a user interface (**UI**), something friendly, mobile compatible, and easy to use for your end users.

Layer 1 (Blockchains) & Layer 2 (Optimizations)

“The design supports a tremendous variety of possible transaction types that I designed years ago. Escrow transactions, bonded contracts, third party arbitration, multi-party signature, etc. If Bitcoin catches on in a big way, these are things we’ll want to explore in the future, but they all had to be designed at the beginning to make sure they would be possible later.” - Satoshi Nakamoto

There are many types of blockchain. Each with its own characteristics. Transactions speeds and transaction costs vary, programmatic capabilities vary, security varies, and other functionality varies. Pick the best one for your intended outcome. In rare cases, you might not find a blockchain that fits your needs, and you would have to get people together to build a new one. Otherwise, just pick from one of the pre-existing ones, which include:

1. Ethereum <https://ethereum.org/en/> and <https://defillama.com/chain/Ethereum>
2. Binance Smart Chain <https://www.binance.org/en/smartChain> and <https://defillama.com/chain/Binance>
3. Solana <https://solana.com/> and <https://defillama.com/chain/Solana>
4. Terra <https://www.terra.money/> and <https://defillama.com/chain/Terra>

5. Polygon <https://polygon.technology/> and <https://defillama.com/chain/Polygon>
6. Avalanche <https://www.avax.network/> and <https://defillama.com/chain/Avalanche>
7. Fantom <https://fantom.foundation/> and <https://defillama.com/chain/Fantom>
8. Waves <https://waves.tech/> and <https://defillama.com/chain/Waves>
9. Huobi Chain <https://www.hecochain.com/en-us/> and <https://defillama.com/chain/Heco>
10. Celo <https://celo.org/> and <https://defillama.com/chain/Celo>
11. Arbitrum <https://offchainlabs.com/> and <https://defillama.com/chain/Arbitrum>
12. Bitcoin* <https://bitcoin.org/en/> and <https://defillama.com/chain/Bitcoin>
13. Others: <https://defillama.com/chains> (as of this writing, there are 48 available)

*The Bitcoin network is not nearly as flexible and adaptable as DeFi as some of the other blockchains, and it needs a layer 2 solution like the Lightning Network.

Layer 2 scaling and optimization solutions basically make the base blockchain (layer 1) faster, cheaper, more scalable, and so on. You can read more:

1. <https://www.block123.com/en/feature/awesome-layer-2-list/>
2. <https://coinmarketcap.com/alexandria/article/what-are-cryptocurrency-layer-2-scaling-solutions>

Remember, we are only in the early days.

Blockchain technology today is where the internet was in the early 1990s. Before the browser was invented, before smart phones, and Google and all that.

Very early days.

DeFi Tokens

What Are Tokens?

In short, tokens are programmable smart units. Usually, programmable smart currency units, but they can serve other purposes besides currency. Tokens are the atomic unit of DeFi.

Think of it this way: Smart Phones have apps. DeFi has tokens. Tokens are the “killer app” in DeFi. You can go wild with your imagination on what you can make tokens for, and how they should act.

A token can represent (i) a right to an asset I own, or (ii) limited access rights to assets or services that others own or provide, or a (iii) voting right.

A token contract is a special type of smart contract that defines a bundle of conditional rights assigned to the token holder. They are rights management tools that can represent any existing digital or physical asset, or access rights to assets someone else owns. Tokens can represent anything from a store of value to a set of permissions in the physical, digital, and legal world. They facilitate collaboration across markets and jurisdictions and allow more transparent, efficient, and fair interactions between market participants, at low costs. Tokens can also incentivize an autonomous group of people to individually contribute to a collective goal.

- Shermin Voshmgir, [“Token Economy”](#)

Tokens are managed collectively by the blockchain ledger they sit on.

The beauty of the system is that the blockchain:

1. Is distributed worldwide and
2. Every node in the blockchain has the exact same information about who owns which tokens, and what the tokens are doing
3. And this happens automatically, driven by code

The current financial system, even in it's electronic form, requires a range of intermediary services for (i) mitigating counterparty risk, (ii) market making, and (iii) securing funds from being stolen. This is a result of the server-centric nature of the current Internet. In a tokenized economy, however, distributed ledgers and user-centric identity solutions could increase ecosystem transparency, accountability, and market efficiency:

- Shermin Voshmgir, "[Token Economy](#)"

Seven Major Token Types

There can be many types of tokens. And in future, I'm sure we will invent even new types. Here are the 7 most common types currently:

1. **Asset** tokens – represent ownership of a digital or physical asset
2. **Platform** tokens – support DApps (distributed apps) built on that blockchain
3. **Identity/credentials** tokens – used to attest the identity and profiles of people, organizations, and machines, without the need for centralized institutions storing and owning our data
4. **Transactional** tokens – serve as mediums of exchange, units of account, and stores of value, and are used to exchange goods and services

5. **Utility** tokens – used to access a protocol or blockchain (e.g. gas fees)
6. **Governance** tokens – for blockchain-based voting and governance
7. **Access-rights** tokens – allow someone else, other than the owner, to access an asset (e.g. a concert ticket, appointment ticket, club membership, transport ticket, house or car sharing token, etc).

Diving Deeper into Asset & Transactional Tokens

Of particular interest is how the blockchain + tokens + smart contracts open a whole new capability of banking assets that were previously un-bankable under the old system:

Asset tokens make the underlying asset more tradable, while the asset itself is still illiquid. Tokenization of assets can convert previously “non-bankable funds” into “bankable funds.” Non-bankable funds are assets that are not accepted as a method of payment in a bank. Bankable funds are forms of payment that are accepted at financial institutions and easily liquidated into local currencies such as checks and money orders. They can be converted into cash with short notice and are generally accepted by merchants as a method of payment. In light of potential widespread tokenization, any tokenized asset could receive the status of a “bankable fund.” Such developments could make any tokenized asset a potential medium of exchange.

- Shermin Voshmgir, “[Token Economy](#)”

With this new technology, almost anything on earth can be tokenized. This opens up a whole new world of possibilities, as you are about to see.

Asset tokens allow the creation of a digital representative for any physical asset or securities and could introduce a range of new use cases that might not have been feasible before. They are the next step in the automation of the securities and asset markets, replacing entire back offices with smart contracts. The tokenization of an existing asset refers to the process of creating a tokenized digital twin for any physical object or financial asset. The token hereby represents the physical counterpart, collectively managed by a distributed ledger. Increasing tokenization of existing assets and access rights could fundamentally impact global economic dynamics, much more than might meet the eye at such an early stage of the Web3. Asset tokens can also be unique and therefore non-fungible. Some refer to them as crypto-goods. Examples would be real estate tokens, crypto-collectibles, or tokens that represent unique pieces of art. Representing such an asset with a token makes the asset more easily tradable and divisible, thus creating more liquidity for some assets that might not have been that easily tradable off-chain. The ability to deploy tokens at a low cost relatively effortlessly on a public infrastructure is a game changer, because it makes it economically feasible to represent many types of assets and access rights in a digital way that might not have been feasible before.

Furthermore, this new technology allows for fractional ownership. Communities can pool together and collectively own and manage an asset they wouldn't otherwise have been able to. Low net-worth communities, by pooling together, can end up having high net-worth assets previously unavailable to them. Fractional ownership exists today, but it is cumbersome, requires tons of document and management, and is generally uncomfortable to deal with. On the blockchain, it is radically easier, cheaper and more pleasant to set up fractional ownership and management of things.

Any physical good or share in a small-or medium-sized enterprise can be tokenized at a fraction of what it would cost in the client-server world and divided into representative tokens, which could be traded on an open market. In order to tokenize a real asset like an apartment, one generates a token with a smart contract, and associates a value of the real asset with that token. The ownership right in such an asset and its corresponding digital representation can be divided into parts and sold to several (co-) owners. Even if a token represents a physical asset that is not divisible, like a piece of art or real estate, the token itself is divisible. An office building, for example, could be collectively bought by members of a co-working space, in which case the decision making could also be collectively managed. The tokens would grant voting rights. The co-working space could be tokenized based on usage rights, where members would have a right to use a certain share of the space. A community of

neighbors could buy and collectively operate a renewable energy-powered micro-grid, as it is more feasible for a collective of neighbors to cover the cost than for an individual. The smart contract would send monthly revenues from the excess energy produced and sold to all members of the collective, in proportion to the shares they owned. Such a setup could also be attractive for taxi drivers. Many drivers lack the money to invest in their own car, and thus work for a company to provide the infrastructure, sharing their revenues or paying a fixed rent to the vehicle's owner. Fractional collective ownership tokens would allow several taxi drivers to collectively purchase a car, instead of renting it from someone, and split up the shifts as well as the costs and revenues involved with buying and maintaining the car for their rides. A smart contract could collect a portion of everyone's revenues, allocated for the expenses involved. Asset markets, such as fine art or real estate, that usually have high economic buy-ins can be tokenized and fractionalized, potentially generating new use cases that were not feasible before. Instead of investing millions of Euros for an art piece, one can now buy a fraction of a painting. This allows for increased market depth and liquidity.

- Shermin Voshmgir, "[Token Economy](#)"

Some examples of groups already doing this or providing the technology to do this include:

- <https://securitize.io/>
- <https://www.bakkt.com/>

- <https://bosonic.digital/>
- <https://www.tzero.com/>
- <https://polymath.network/>
- <https://neufund.org/>
- <https://cezex.io/>
- <https://www.templuminc.com/>
- <https://bancor.network/>
- <https://atlant.io/>
- <https://ihtcoin.com/>
- <https://bitcoinup.io/etherty/>

It's Not All About Money: Purpose-Driven Tokens and Their Potential to Save The Environment and Communities Using DeFi

One thing that the current monetary system really, really sucks at is protecting Public Goods, the Commons. Things like the environment, forests, communities. The current monetary system has no incentives built-in to protect these most important aspects of our home planet. In fact, it does the opposite, it destroys them. Leading to what we call “the tragedy of the commons”.

DeFi can fix this, using Purpose-Driven Tokens.

Public Goods = a commodity or service that is provided without profit to all members of a society. E.g., free health care, the Internet.

The Commons = land or resources belonging to or affecting the whole of a community. E.g., the environment, the oceans, water, air.

Tragedy of the Commons = a problem that occurs when individuals neglect the well-being of society in the pursuit of personal gain. A situation in which individual users, who have open access to a resource unhampered by shared social structures or formal rules that govern access and use, act independently according to their own self-interest and,

contrary to the common good of all users, cause depletion of the resource through their uncoordinated action. E.g., polluting and overfishing the oceans.

Purpose-driven tokens incentivize individual behavior to contribute to a collective goal. This collective goal might be a public good or the reduction of negative externalities to a common good. Purpose-driven tokens introduce a new form of collective value creation without traditional intermediaries. They provide an alternative to the conventional economic system, which predominantly incentivizes individual value creation in the form of private goods.

- Shermin Voshmgir, "[Token Economy](#)"

Incentivizing CO2 emission reduction: Cryptographic tokens issued by a smart contract can also be used to incentivize individuals and corporations to act in a sustainable manner. In such a setup, individuals and organizations who can prove that they reduced CO2 emissions can be rewarded with a token that is created (minted) upon such proof. Depending on the design of the token, the CO2 rewards could be exchanged for some other services provided by the organization issuing these tokens, and can vary greatly from project to project.

- Shermin Voshmgir, "[Token Economy](#)"

"Vienna Kultur-Token," "Sweatcoin," or "Changers" incentivize riding a bike, walking, or using public transportation instead of using a car. Other projects incentivize the production or consumption of renewable energies such as "Solar Coin," "Electric Chain," and "Sun Exchange." Alternatively, people could be incentivized with a token every time they prove that they have used less energy by using energy-efficient devices, or turning the lights off, as in the case of "Energi Mine" or "Electron." One could also be incentivized for planting trees (Proof-of-Tree-Planted), or cleaning a beach (Proof-of-Bottles-Recycled), reduction of food waste, and many more.

- Shermin Voshmgir, "[Token Economy](#)"

Because corporate environmental sustainability efforts are no longer considered purely voluntary, this is not something to scoff at. Customers and shareholders now expect companies to prove they are acting meaningfully towards emissions reductions and environmental sustainability. Legislators are creating new tougher regulations that require proof of compliance, too.

By some estimates, the assets held by institutions that must commit to divestment from fossil fuels was approximately \$5 trillion in 2017.

Furthermore, according to the World Forum On Natural Capital, "Natural capital can be defined as the world's stocks of natural assets

which include geology, soil, air, water and all living things.” Researchers in 2011 estimated that the value of Natural Capital and Natural Assets was about **\$124 trillion per year**. They did this so they could estimate the value of mitigating actions and behaviors that have negative environmental impact. For example, **every year we lose \$20 trillion** worth of the world’s ecosystem just from deforestation, lost wetlands, and lost coral reefs, alone.

And so, DeFi can be used to create solutions around this. By tokenizing natural assets.

For example, forests reduce carbon emissions, in a process known as sequestration²⁷. A forest has more value sequestering carbon than it has if we chop it down. By measuring this value and making it investable, people suddenly have a lot more interest (and profits) in keeping the forest alive, than in chopping it down. Remember, carbon credits have value and are already traded internationally in huge volumes. The anti-carbon emissions market is huge and growing! People can invest in tokens designed to protect the forest. And that money can be used to physically protect the forest from loggers and so on. But how do we measure the value of a particular forests’ sequestration of carbon? By working with organizations like:

- <https://www.goldstandard.org/>
- <https://www.planvivo.org/>
- <https://verra.org/>

Purpose-Driven Tokens can be programmed to maintain or restore a common good or a public good, help address social concerns like unemployment or inequality, and address the Commons, like maintaining the community and saving the environment. And because of the LEGO-like nature of DeFi, one can build all sorts of incentives to make it work. The potential to solve many of the world’s problems using Purpose-Driven Tokens is immense, limited only by our imagination.

Examples of current purpose-driven tokens or token proposals include:

²⁷ <https://www.usgs.gov/faqs/what-carbon-sequestration>

- <https://plasticbank.com/about/>
- <https://joinseeds.earth/>
- <https://www.ecocoin.com/>
- <https://positiveblockchain.io/database/recycle-to-coin/>
- <https://www.single.earth/>
- <https://climatetrade.com/>

How To Design a Token System

Again, it is beyond the scope of this book to cover each of these topics exhaustively. So here, we shall just summarize the big picture of token design. For more details, I recommend you get a copy of “[Token Economy](#)” by Shermin Voshmgir, plus related technical books and papers.

Now, besides the obvious technical requirements handled by code, these are the core aspects you must consider when designing a token:

1. Technical engineering
2. Legal engineering
3. Economic engineering
4. Ethical engineering
5. Fungibility of your token
6. Exchangeability of your token

For this summary, we shall quote from “[Token Economy](#)” by Shermin Voshmgir.

Technical Engineering:

When creating a token system, one needs to decide whether to create an infrastructure token or an application token, and how to technically implement the token system. “Infrastructure tokens” are tokens

that either steer public blockchain networks (1st layer) or second-layer protocols such as state channels, or other Web3 protocols such as distributed file storage networks. These infrastructure tokens are purpose driven, incentivizing collective maintenance of said networks. The most important design questions in the engineering process are related to questions of security, scalability, and privacy. “Application tokens” are managed by an underlying distributed ledger and other Web3 networks. The technical engineering process will need to consider which infrastructure and token standards to use. It furthermore needs to consider potential interoperability needs of the token system.

- Shermin Voshmgir, “[Token Economy](#)”

Legal Engineering:

Legal engineering, therefore, refers to the tokenization of traditional governance models where smart contracts replace many of the existing human/ paper/ client-server–based operations.

- Shermin Voshmgir, “[Token Economy](#)”

Economic Engineering:

This pertains primarily to the monetary and fiscal policy of your tokens, and other economic considerations.

Monetary Policy = the control of the quantity of tokens available in an economy, the channels by which new tokens are supplied, and the velocity they are supplied at. By managing the token supply, the system can influence macroeconomic factors like inflation, rate of consumption, economic growth, and overall liquidity. With tokens, this can be managed automatically by algorithms, or by voting by the group members (consensus), or both. In CeFi, interest rates are also part of monetary policy. DeFi expands on this, giving us very creative options. For instance, a token can be optimized to be a great medium of exchange (MoE) by build demurrage (negative interest) into the token to discourage hoarding and encourage circulation. Whereas another token can be optimized as a store of value (SoV) for saving (hoarding). The problem with CeFi fiat currencies is that they try to bundle MoE UoA and SoV into a single currency, whereas it is often more practical and advantageous to split those functions into separate tokens. Tokens built to enhance trade, optimized as an MoE, possibly with built in demurrage so they lose value if held, so better to spend them. And different tokens built to enhance savings, optimized as SoVs that hold and increase in value over time.

If the purpose of money is exchange, it should be spent; if the purpose is saving, it should be held. These are mutually contradictory objectives that we must find a way to separate.

- Thomas Greco, "[Money](#)"

Fiscal Policy = In CeFi, it mainly refers to governments use of spending and tax policy to influence the economy. DeFi provides a somewhat different but greater opportunity.

In public and permissionless blockchain networks, fiscal policy could be reflected by the level of “transaction costs” that one has to pay for network transactions. This might be comparable with value-added taxes that national governments collect, only that the tax collectors, in the case of a public blockchain, are autonomous nodes validating transactions and getting rewarded for their network services. In a Proof-of-Stake setup, “fiscal policy” mechanisms are reflected in protocol variables such as (i) staking, (ii) vesting periods, and (i) reserve pools that fill or deplete based on bonding curve mechanisms.

- Shermin Voshmgir, “[Token Economy](#)”

In their institutional structure, Web3 networks resemble nation states much more than they resemble companies. The blockchain protocol is comparable to the constitution and the governing laws of a nation state. The autonomous actors in the network are the sovereigns of the network, and are therefore subject to the network constitution, the blockchain protocol or smart contract code. The monetary policy of a Proof-of-Work network, for example, is defined in the protocol, and regulates the circumstances under which a network token is minted. The fiscal policy is also defined in the protocol, and regulates the transaction fees. Stakeholders can opt in and opt out at any time, decide to become active members of the community and

participate in the development of the code, or decide over code changes when there is a code upgrade.

Nation states are comparable to permissioned networks, rather than permissionless networks. In most countries, only citizens of said nation states have the privilege to be part of the network, or in other words, to live and work in that country. Non-citizens may receive temporary permission to enter the country or work in the country. While you can opt in and opt out, by way of immigration or emigration, this option usually comes at high personal and economic cost and takes time. Nation states steer the actions of their citizens mostly by disincentive: when you break the law, you have to pay a fine or go to jail. Taxes can be considered as network transaction costs that citizens pay to receive government services. In some cases, national governments institute tax breaks and subsidies that act as positive incentives to “nudge” their citizens into a specific behavior. Tax policy is part of the fiscal policy of a country that, together with the policies of the central bank, decides over monetary policies, which intend to steer the network actors into certain economic behavior.

- Shermin Voshmgir, “[Token Economy](#)”

Other important considerations include the divisibility, fungibility and exchangeability of your token. It has to be at a level that is suited for your use case.

The tools that are necessary to design such systems can be found in economics, network science, cyber-physical systems, and sociotechnical systems.

- Shermin Voshmgir, "[Token Economy](#)"

Ethical Engineering:

The design of token systems also requires ethical and political thinking. What type of system we want to create is not a technological question but a socio-economic and political question. Questions of politics, morals, and ethics will need to be answered, ideally before the design of such systems. If we fail to incorporate ethical questions in the design thinking process of such systems, we will create "protocol bias." History has shown that, eventually, all these questions will need to be resolved. However, if that is done after the fact, after a system has been created, these biases are hard to reverse due to system inertia.

- Shermin Voshmgir, "[Token Economy](#)"

Some key ethical considerations include transparency vs privacy, decentralization and security vs speed and scalability. Fungibility also comes into consideration here because the more private a token is, the more fungible it is. For example, paper cash transactions are completely anonymous and untraceable, and that is what makes paper cash fungible. The more you can track a transaction to a person, the less privacy and less

fungibility a token has, and that makes it less useful and powerful as a medium of exchange (MoE).

Also, consider advanced capabilities we otherwise wouldn't think of with CeFi, such as the use of AI to make things better.

In such a future scenario, powered by AI and DeFi applications, atomic swaps could potentially introduce a tokenized barter economy powered by global trading platforms, without the coincidence-of-wants problem we face today.

- Shermin Voshmgir, "[Token Economy](#)"

DeFi Smart Contracts

A smart contract is a computer program or a transaction protocol which is intended to automatically execute, control or document legally relevant events and actions according to the terms of a contract or an agreement.

Investopedia defines it as follows: "A smart contract is a self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. The code controls the execution, and transactions are trackable and irreversible. Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism."

In short: a programmable contract that allows counterparties to transact without needing to trust each other or a third party for execution and enforcement.

Two of the most attractive qualities of smart contracts, beyond their programmable capability, is that they are:

1. tamper-proof (because they sit on the blockchain)
2. transparent (anyone can examine the code and audit it to make sure it does what it says it does, and it allows for collective loophole fixing).

Smart contracts can furthermore be used to create and manage cryptographic tokens that can represent any asset or access rights, and even incentivize behavior. Tokens might emerge to be one of the most important applications of smart contracts, potentially revolutionizing asset management as we know it.

- Shermin Voshmgir, "[Token Economy](#)"

Multiple smart contracts can be combined to create a decentralized application (DApp) or a decentralized autonomous organization (DAO). Basically, applications and organizations that are governed by code, rather than human management structures.

Smart contracts reduce the transaction costs of agreements. Specifically, they reduce the costs of (i) reaching an agreement, (ii) formalization, and (iii) enforcement. If implemented correctly, smart contracts could provide transaction security superior to traditional contract law, thereby reducing coordination costs of auditing and enforcement of such agreements. Smart contracts also bypass the principal-agent dilemma of organizations, providing more transparency and accountability, and reducing bureaucracy.

DeFi Oracles & Data Aggregators

Smart contracts sometimes need data from outside of the blockchain. Information that is relevant to the contract often sits outside of the blockchain, in the outside world. And a smart contract may need that information, so that it can know what to do.

That is where Oracles come in. Oracles feed smart contracts with data from outside the blockchain.

DeFi is powered by smart contracts. Sometimes, the inputs required to produce an output consist of real-world data not stored on the blockchain, such as weather conditions or traffic information. There is a need for protocols to bridge the gap by relaying off-chain data onto the blockchain for smart contracts to interact with the data. Off-chain information is an integral part of DeFi and should always be valid and accurate. Having false data will completely misrepresent a particular project and cause major problems for DeFi. However, how do we ensure that the data provided is always accurate and can be trusted? Some protocols aim to achieve this by transmitting and broadcasting data onto the blockchain without being manipulated or tampered with. This is usually done through a voting or consensus mechanism where validators agree on the most accurate data. Without oracles or data aggregators as the main "source of

truth”, bad actors can make use of false information to take advantage of unsuspecting users.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, “[How to DeFi: Advanced](#)”

If oracles bridge real-world data to the blockchain, then data aggregators help users to read it. These protocols compile blockchain data into a simplified format, making it easier for projects and individual users to create their analytics dashboard.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, “[How to DeFi: Advanced](#)”

Oracles can be categorized as follows:

1. Software or hardware
2. Inbound or outbound
3. Centralized or decentralized
4. Contract-specific or general
5. Machine or human

And That is DeFi in a Nutshell

And there we have it!
That is DeFi in a nutshell.

Blockchain + Tokens + Smart Contracts + Oracles & Data Aggregators

Once you see it that way, it becomes easier to understand.

The possibilities are limited only by our imagination, and technical development. The LEGO-like nature of DeFi means we can build things unimaginable just a few years ago. And what the future will build is beyond our present imagination! DeFi has the potential to be massive, and to change society as we know it.

Especially in future, once these components are simplified and made easy-to-use for non-programmers. Whereby anyone with zero programming knowledge can create a local monetary system for their community in minutes, through their phone.

Let us now see the true hidden power and possibilities of DeFi!

The Major Categories of DeFi Financial Products And Services

The various pieces of DeFi, the “LEGO bricks”, the **Blockchain + Tokens + Smart Contracts + Oracles & Data Aggregators**, can be put together to create the following financial products and services:

Decentralized Payments

Payment systems whereby users can transact without having to trust a third-party.

Beyond that, we are now able to do so much more with payments! For example, micro-payments, instant global remittance, smart programmable money, payment streams (like a water stream, enabling a pay-as-you-go or pay-by-the-second model, like <https://sablir.finance/> does), machine-to-machine payments in IoT (e.g., <https://www.iota.org/>), and much more.

The way we think of payments is set to radically change.

Decentralized Lending and Borrowing

Decentralized lending and borrowing means that people can borrow money even if they don't have a bank account, ID, or credit score. They can also collateralize more types of assets for security.

The role of an intermediary is taken up by banks and trust is maintained via a convoluted system of credit, whereby the borrower must exhibit the ability to repay the loan in order to be qualified to borrow, among a laundry list of other qualifications and requirements by the banks. This has led to various challenges and shortfalls of the current lending and borrowing system, such as restrictive funding criteria, geographical or legal restriction to access banks, high barriers to loan

acceptance, and the exclusivity of only the wealthy to enjoy the benefits of low-risk high-returns lending. In the DeFi landscape, such barriers do not exist as banks are no longer necessary. With enough collateral, anyone can have access to capital to do whatever they want. Capital lending is also something that is no longer enjoyed only by the wealthy, everyone can contribute to a decentralized liquidity pool of which borrowers can take from and pay back at an algorithmically-determined interest rate. In contrast to applying for a loan from the bank where there are stringent Know-your-customer (KYC) and Anti-money laundering (AML) policies, one only needs to provide collateral to take a loan in DeFi.

- Darren Lau, Daryl Lau, Teh Sze Jin, Kristian Kho, Erina Azmi, TM Lee, Bobby Ong, "[How to DeFi: Beginner](#)"

Fully decentralized lending services enable a two-sided market, using smart contracts for P2P credit and P2P lending of tokens. Any non-bankable asset such as commodities, securities, real estate, art, SME shares, etc. could, in the future, be represented by a token. Commodities, national currencies, and securities are already being tokenized and can be traded on markets today, while tokenized real estate, art, and SME shares are still in their early stages of conceptualization. Any transferable tokens representing an asset could be used as collateral for open decentralized lending solutions,

which could change the dynamics of our global economic system. The integrations of such tokenized non-bankable assets with lending and borrowing schemes would allow for instant transactions, which surpasses the possibilities of the legacy systems we have today.

Smart contract–based execution of credit and lending services have lower operational costs than legacy financial services, as compliance verification could be executed on the fly. In a fully decentralized setup, P2P financial services only require a crypto-wallet, without complex identification systems. They allow for more control, security, and inclusion. P2P lending could easily be brokered by a smart contract. Dormant and previously non-bankable assets from around the world can now be tokenized to create a liquid P2P lending market. Anyone can earn passive income relatively risk free on their token holdings through interest paid by the borrowers. On the other hand, lower operational costs could also make loans more affordable for a wider array of people and institutions.

- Shermin Voshmgir, "[Token Economy](#)"

Current examples include:

- <https://compound.finance/>
- <https://www.colendi.com/>
- <https://lendoit.com/>
- <https://nexo.io/>

- <https://aave.com/>
- <https://blockfi.com/>

Decentralized Stable Coins

Tokens are an important part of a tokenized economy. If they are unstable, people won't use them as money. Because it would be hard to pay for things like rent with tokens that might lose their value quickly or that go up and down in price often. For certain payments, smart contracts and apps will only become popular if the tokens used on them are stable too, for both the buyer and the seller.

Short-term stability of value is very important for the MoE and UoA function of money. There are various ways to create stability, including:

1. fiat-collateralized (e.g. the popular stablecoin Tether (USDT), which is pegged to the US dollar, by, theoretically at least, having USD \$1 in reserve to back every 1 USDT)
2. commodity-collateralized
3. crypto-collateralized
4. algorithmic
5. rebase

Algorithmic stablecoins are effectively DeFi's take on replacing a central bank, while algorithmic stableassets are DeFi's way to emulate the Gold Standard and create reliable digital collateral. In traditional finance, a successful monetary system requires a competent and independent financial authority. In DeFi, competency is sourced from pseudo-anonymous individuals who are incentivized to collaborate and act rationally.

A rebase model controls the price by changing the entire supply of the stablecoin. Depending on whether

the price of the stablecoin is above or below the intended peg, the protocol will automatically increase or decrease the supply in every holder's wallet over a fixed period. The reasoning for this is that by forcefully controlling the supply, the price of the stablecoin can be influenced based on a simple inflationary/ deflationary economic theory.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

Examples include:

- <https://makerdao.com/en/>
- <https://tether.to/>
- <https://www.binance.com/en/busd>

Decentralized Stable Interest Rates

Like with stable coins, stable interest rates serve a very important function in the economy.

In CeFi, fixed interest rates typically came from fixed deposits and bonds. In DeFi, they would come from the algorithms within a token, designed to incentivize the maintaining of interest rates.

Decentralized Exchanges

Exchanges include stock exchanges, forex exchanges, commodity exchanges, and so on. Exchanges have traditionally been centralized, forcing participants to deposit their assets with the third-party intermediaries and custodians. This means participants don't have full control of their assets, and their assets are at risk if the exchange fails or is hacked.

DeFi exchanges aim to solve this issue by enabling participants to maintain custody of their assets even as they trade on an exchange.

Examples include:

- <https://uniswap.org/>
- <https://dydx.exchange/>

Decentralized Insurance

The global insurance industry is worth over \$6 trillion. DeFi is also capable of providing both traditional insurance, and new forms of insurance that we haven't yet thought of, and financing that insurance in ways that would be impossible under CeFi.

Decentralized Fund Management & Indices

The transparency of DeFi means investors have better information, visibility, and control of their assets than they would in traditional funds and indices. They are also better able to reduce costs and maintain stronger custody of their assets.

Decentralized Derivatives

Derivatives have traditionally been created and traded on centralized platforms and markets. DeFi is creating decentralized platforms for derivatives. Which has many advantages, including enabling smaller players to participate in derivatives that were in the past only accessible to big players.

Examples include <https://synthetix.io/>.

Decentralized Yield Farming, Predication Markets, and Lotteries

These are also possible with DeFi.

Yield Farming is basically staking your assets in a lending pool and earning interest from borrowers.

Prediction Markets are exchange-traded markets created for the purpose of trading the outcome of events. The market prices can indicate what the crowd thinks the probability of the event is.

Lotteries are also possible with DeFi, and quite interesting. For example, it allows for the public to fund the lottery and benefit from that, as well as play the other side as a punter.

Alternative Monetary Systems (Local, Regional & Global) That Can Be Built Using DeFi

The various pieces of DeFi, the “LEGO bricks”, the **Blockchain + Tokens + Smart Contracts + Oracles & Data Aggregators**, can be put together to create the following types of monetary systems:

DeFi Complementary Currencies (LETS, Time Dollars and Others)

What Is a Complementary Currency?

“The first way to address the “war on poverty” is to get rid of currency inflation and return to a form of money whose value holds over the long term.”

- Satoshi, [“The Book Of Satoshi: The Collected Writings of Bitcoin Creator Satoshi Nakamoto”](#)”

A complementary currency is a currency or medium of exchange (MoE) that is not a national currency, but supplements or complements national currencies.

Complementary currencies are usually not legal tender. They are usually created and used based agreement between a group of people or a community that agrees to use the currency. Rarely are they national in scope. Instead, they usually serve sub-groups that have a common interest or a common local geography.

There are two main types of proven complimentary currencies that have been used historically, before the invention of the blockchain:

1. [Local Exchange Trading Systems \(LETS\)](#)²⁸
2. [Time Dollars](#)²⁹

These are not new. They used to be very popular in history. Even today, they are still used in small pockets of the world. They are extremely powerful when used well.

And now, if built using DeFi, they hold even greater potential.

This is yet another vast subject, so I shall be quoting from selected books, and encourage you to read those books for full details.

LETS and Time Dollars are both money, and like other complementary currencies, enjoy the full functionality of money. They should not be mistaken for barter exchanges, in which goods and services are swapped bilaterally without any standardized medium of exchange. An inherent limitation of barter exchanges is that they require a “double coincidence of wants;” resources and needs must match up perfectly between two parties for a transaction to take place. In a barter transaction, if one person needs shoes and another food, the exchange can only be completed if each possesses the particular item wanted by the other.

As money, LETS and Time Dollars overcome the limitations of barter. Each system provides an internal currency—a medium of exchange used by all members within a given LETS or Time community—which permits participants to select from a much wider variety of goods and services. LETS, Time Dollars, and other complementary currencies enable many exchanges that would not otherwise take place and allow communities

²⁸ <https://www.investopedia.com/terms/l/local-exchange-trading-systems-lets.asp>

²⁹ <https://www.investopedia.com/terms/t/time-based-currency.asp>

and society-at-large to better meet their many needs. Many other social-purpose complementary currency designs are possible.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

The structure of well-designed complementary currencies also clarifies why, in contrast to what some economists might suspect, this form of money does not add to inflationary pressures. Inflation risk would be valid if, and only if, the complementary currency were designed as a fiat currency, like the dollar, euro, pound, and other national currencies. LETS and Time Dollars are not fiat currencies; they are each mutual credit systems, in which money is created only when an agreement is made, with a simultaneous credit and debit charged to the parties involved. This ensures that just enough money is created specifically for the transaction at hand— and no more. In this way, all mutual credit currencies automatically create their corresponding supply of goods and services when they are put into circulation.

It is essential to understand that most complementary currencies are intrinsically different from fiat currencies and are intentionally designed to avoid contributing to inflation. All our notions regarding inflation emanate from a traditional economic perspective, which implicitly assumes a

monopoly of one single fiat currency in use within a given country or region. This perspective holds that inflation results whenever there are not enough goods and services produced for the quantity of money in circulation. Such a premise is, however, simply not applicable to well-designed complementary currencies.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Currently, in thousands of communities globally, there are networks of businesses that span a country or a continent and groups of netizens who are reassessing and reengineering money with astonishing results. Individuals, entrepreneurs, businesses, communities, and governments in many countries around the world have already created new cooperative money systems that link unmet needs with resources that remain unused by the dominant competitive currency of each country. These new strategies do not replace the conventional monetary systems but rather work in tandem, shifting the predominant features of scarcity and hyper-competitiveness to ones that provide new options and additional resources for everyone. Regular people have discovered not only that it is possible to create money in sufficiency for their needs but also that it is simultaneously possible to build their societies with greater cooperation, care, and collaboration. In other words, they are proving not only that it is possible to

redesign money but also that doing so fosters very different and highly desirable outcomes.

- Bernard Lietaer, Jacqui Dunne, "[Rethinking Money](#)"

It seems axiomatic that whenever a government fails to provide an adequate supply of currency or coin to maintain commercial trade, the people will step in to provide their own to fill the vacuum.

If the network is to avoid disintegration, the various clubs will need to come to some clear agreement on standards of practice for the proper issuance and management of their currencies.

The exchange media described put control of the exchange process into the hands of the people, giving them more choice over how they apply their energies and resources.

If the system account receives an amount of goods or services, or even official money, and gives local currency in exchange for it, the system account is the issuer of that local currency.

Let the author reemphasize the importance of the fundamental, ongoing commitment of the participants: they must continue their support of the local currency by their willingness to accept it in payment.

This commitment need not be enforced legally, but whatever can be done should be done to promote loyalty and solidarity among those who have been empowered to emit credits or currency.

The author must emphasize that it is crucial to gain broad-based community support, which includes the participation of local businesses.

Community currency would no longer be a novel curiosity associated with the fringes of society but will become “mainstream” and will demonstrate its true potential for building healthy communities and strong local economies.

- Thomas Greco, “[Money](#)”

How LETS Currencies Work

A LETS scheme is really just a network of people who agree to share their skills with each other by means of a local currency that they have created and agree to use. For more on LETS, including where to find your local LETS, contact LETSlink UK: www.letslinkuk.net

The system is simple. A group of interested people get together and list all the skills they have to offer and the things they want, together with their phone numbers, in a directory. The directory can be printed out, photocopied, or put on the web. They then agree

to create and accept money from each other, which they back with their commitment to do enough work to pay this 'commitment' (not 'debt') off in a reasonable time in the future. LETS works as follows.

- *If Dave wants someone to cut his lawn, he looks in the directory, and sees that Sarah is offering that service.*

- *Dave phones up Sarah, who agrees to come round at the weekend to cut Dave's lawn, and she says that she charges six LETS pounds an hour. Dave thinks that's fine.*

- *Sarah cuts the lawn, and Dave writes out a cheque for six LETS pounds, which he gives to Sarah. Dave doesn't need to have six LETS pounds in his account to start – he writes a cheque, thereby agreeing to earn six LETS pounds to pay off his 'commitment' to the community in the future.*

- *Sarah then 'banks' the cheque by sending it to the LETS treasurer, who keeps the accounts on her computer and sends out LETS bank statements periodically. Using the LETS software, the treasurer debits Dave's account six LETS pounds, and credits Sarah's account for the same amount.*

- *Later that week, Sarah asks Jim to give her a lift into town, and Jim charges Sarah six LETS pounds for the service, but before he can go, his car needs a clean.*

- *Jim asks Dave to valet his car, which Dave does, earning back the LETS pounds he has paid Sarah.*

That's how it works – everyone has had their needs met, and been paid, without using any conventional money. You don't need any local money before you start – you just make a commitment to work for someone who asks you to in the future, and honour that commitment in return for the right to create the money you have just paid out, and you back it with your personal commitment.

The beauty of the system is that if you add together all the credits and debits held on the computer by all the participants, they balance out at zero. Over a reasonable amount of time, everyone is expected to personally balance the credits they spend with those they earn, so their personal account balance also hovers around zero.

- Peter North, "[Local Money](#)"

LETS is an acronym that represents a community exchange system originally called "Local Exchange Trading System." That system is now often referred to as "Local Employment and Trading System." It is the best known example of a type of system that can be generically referred to as "mutual credit" or "community credit." LETS was originated in the early

1980s in British Columbia, Canada, by Michael Linton, a Scottish engineer. From that point on, LETS groups quickly proliferated, initially within the English-speaking countries, then later around the world. The success of this particular current in the community credit movement has been most notable in Australia, New Zealand, and the United Kingdom, where it has become widely recognized and has received considerable support in both academic and government circles.

Living in a place where the economy was depressed, Linton came to realize that the only thing missing was sufficient money to bring buyers and sellers together. The natural resources were there, the skills and talents were there, the needs were there, but the money wasn't there, at least not in sufficient amounts. Recognizing the limitations and dysfunctions of the dominant national currency systems, Linton devised an approach to facilitating trade without the need for scarce official money. He realized that the fundamental characteristic of money, which allows it to facilitate exchange, is the information that it carries. He envisioned another information system that would be locally controlled and operated in parallel with the official monetary system. He designed LETS as a not-for-profit association run by and for its members. It was never intended to replace the official currency but only to supplement it. By its nature, a LETS, like most community-based mutual credit systems, is limited, local, and personal, and these are the characteristics that give it its strength.

A LETS group operates very much like a commercial “barter” system, but it has several notable differences in its philosophy, intent, and practice:

1. A LETS is a not-for-profit cooperative arrangement, usually unincorporated and operated by volunteers, whereas commercial “barter” exchanges are for-profit businesses.

2. A LETS caters to individual traders, although business members are also welcome and desired, while commercial exchanges favor large-volume business clients.

3. In a LETS, the initiation and membership fees are nominal, sufficient only to cover the modest operating expenses of the system. Commercial exchanges charge large cash fees for membership and take a substantial percentage, usually in cash, on each transaction.

4. In a LETS, there is generally no interest charged or paid on either debit or credit balances.

5. Commercial exchanges often require that their members’ lines of credit be secured by the pledge of some collateral. In LETS there is no such requirement.

6. While commercial exchanges actively broker trades among their members, a LETS functions only as a clearinghouse and information service; there is generally no brokering of goods or services by the LETS staff.

Since a LETS is a membership organization, LETS credits can be spent only within the membership group. This stimulates the local LETS members to produce for their own needs and to import less from outside. Reducing imports from outside reduces the need to earn official currency. Because it is small and personal, a LETS also builds community and encourages members to support one another in a variety of ways.

A LETS arrangement typically consists of a set of accounts, usually kept on a personal computer. It is like a bank in that each member has an account to which transactions are credited or debited. Like a checking account, your LETS account is credited (increased) when you sell something and debited (reduced) when you buy something. The two parties to the trade negotiate the price as they ordinarily would for a cash transaction, but, instead of using cash, the seller receives credits and the buyer is “charged” a corresponding amount as a debit.

The unit of account in the original LETS was the “green dollar,” and LETS credits are still often referred to simply as “green,” but each local LETS, being independent, is free to choose any name it wants for its accounting unit. Since we are all accustomed to evaluating transactions in terms of the official currency, LETS uses that same value concept (dollars in the United States, pounds in Britain, francs in France, and so forth) for accounting. Thus, members tend to equate the value of a “green dollar” with the value of a Federal Reserve dollar in the United States or a Bank of Canada dollar in Canada. Unlike official dollar-denominated

bank credits or cash, however, which can be created only by the banking system, LETS dollars or green dollar credits are created by LETS members themselves, as needed, to execute a trade. This is the crucial element that makes LETS and other mutual credit systems so empowering.

Every account begins with a balance of zero. Sales of goods or services add to one's account balance, while purchases reduce one's balance.

Account balances may be negative, and normally there is no interest charged on either negative or positive balances, though the members may agree to limit the amount of debit that a member may carry. A member with a negative or debit balance, however, is "committed" to supply that much value to others in the system at some time in the future. Having a negative balance in a LETS is not a problem. In fact, positive balances can exist only if there are negative balances. The total of positive balances in a LETS is always equal to the total of negative balances. Besides not charging interest on balances, there is no repayment schedule for debit balances in a LETS. There is, however, the expectation that members with debit balances will actively offer their services to prevent their accounts being permanently in debit. Members' balances are not secret but may be made known to any other member on request. Some LETS groups routinely publish all account balances periodically to give members a sense of the state of the system. It is still a matter of debate as to whether the published list of account balances should include members' names.

Transactions are reported to the LETS registrar or record keeper by either telephone or mail. Account balances are updated periodically, and each member is sent a statement of account showing his or her transactions for the period along with beginning and ending balances. In addition to the account statement, members usually receive a "noticeboard" or listing of goods and services currently being offered and requested. This noticeboard is actually a form of classified advertising by which members can advertise what they want and what they have to sell. Some LETS groups also publish a directory that gives more details about each members' interests, skills, and needs.

As with any system, there are costs involved in the operation of a LETS. Some of these are cash costs for such things as copying, postage, and telephone service. These are usually covered by charging an annual membership fee and/or setup fee in cash. Other costs, such as recordkeeping, publication, management, and other services provided by LETS members are typically paid in LETS credits. These are covered by charging members, in LETS credits or green dollars, for recording transactions, printing account statements, and noticeboard advertising.

To illustrate how LETS works, let us trace the steps one might take from becoming a member to receiving his or her first statement of account. Suppose Amy wishes to join the Happy Valley LETS. She fills out a membership agreement and pays an initial setup fee of five dollars, plus her first year's membership fee of fifteen dollars. She is given a copy of the current

noticeboard and directory and an instruction sheet telling how to report transactions, as well as other system procedures. Amy's account balance begins at zero.

Amy sees from the noticeboard listings that Sarah is offering automobile tune-ups and that John is offering deep massage and acupuncture treatments. She also notes that Harold wants fresh-baked, wholewheat bread and fresh vegetables. Amy sees in each of these a potential trade. She negotiates with Sarah to have her car tuned up. They agree on a price of 30 green dollars, plus \$20 in cash to cover the cost of ignition points and spark plugs. She also negotiates with John to get two acupuncture treatments for a total of 40 green dollars plus \$10 cash. Next, Amy sells to Harold two loaves of her fresh-baked bread for 5 green dollars; she also sells him an assortment of vegetables from her garden for 10 green dollars.

The cash portion of the transactions is handled by the parties to the trades. Only the green dollar amounts are reported to the LETS registrar. On the tune-up, Amy is debited 30, on the acupuncture treatments she is debited 40, and on her sales to Harold she is credited 15. If this is the extent of her trading for the period, her account statement at the end of the period will show a negative or debit balance of 55 green dollars ($-30 -40 +15$). There might also be system charges (additional debits) of 2 green dollars for her own notice-board advertising and statement fee, making her ending balance a minus 57. Meanwhile, Sarah's account has

been credited 30, John's has been credited 40, and Harold's has been debited 15.

There is no particular time within which Amy must clear her debit balance. She understands, however, that her debit represents her promise to the community of members. She will, in all probability, try to keep her debit balance from becoming chronic or excessive. A primary reason for making account balances public within the system is to encourage self-regulation. In such a situation, a member with a chronic or excessive debit balance may find it increasingly difficult to find members willing to sell to her or him. By using the LETS, Amy has "saved" \$55 of hard-to-get cash on services that she needed, has employed her friends and neighbors, and has, in effect, employed herself by providing others with the means to purchase her own goods and services.

- Thomas Greco, "[Money](#)"

Time Banking Currencies (Time Dollars)

Time banking is designed to recognize people and the work that society often devalues. For example, people who help repair and improve an environment or neighbourhood, or people such as unemployed youth, the elderly, and alternative lifestyle people. They all have something to contribute but might not fit into standard job descriptions.

The following is quoted from <https://timebanks.org/what-is-timebanking/>:

Time banking Basics:

Time banking is a kind of money. Give one hour of service to another and receive one time credit.

For one person to earn a time credit, however, someone else has to agree to give it. Time banking happens when a network or circle of members have agreed that they will give and receive credits for services that other members provide. Those networks are called “timebanks.”

That’s almost it.

To be successful, timebanks need leadership – or perhaps the better word is “governance.” They need agreements around what’s OK and what’s not OK in relation to earning and spending. To guide those, one additional and most important aspect of time banking is the core values.

The Five Core Values of Time Banking:

*Edgar Cahn is the founder of modern timebanking. He noticed that successful timebanks almost always work with some specific core values in place. In his book *No More Throw-Away People*, he listed four values. Later, he added a fifth. These have come to be widely shared as the five core values of timebanking – and most timebanks strive to follow them. They are a strong starting point for successful timebanking.*

Asset Every one of us has something of value to share with someone else.

Redefining Work There are some forms of work that money will not easily pay for, like building strong families, revitalizing neighborhoods, making democracy work, advancing social justice. Time credits were designed to reward, recognize and honor that work.

Reciprocity Helping that works as a two-way street empowers everyone involved – the receiver as well as the giver. The question: “How can I help you?” needs to change so we ask: “Will you help someone too?” Paying it forward ensures that, together, we help each other build the world we all will live in.

Social Networks Helping each other, we reweave communities of support, strength & trust. Community is built by sinking roots, building trust, creating networks. By using timebanking, we can strengthen and support these activities.

Respect Respect underlies freedom of speech, freedom of religion, and everything we value. Respect supplies the heart and soul of democracy. We strive to respect where people are in the moment, not where we hope they will be at some future point.

TimeBank Giving and Receiving – Four Kinds:

It’s helpful to think of four main kinds of timebank exchanges:

1:1 – One person gives another person a ride to the doctor.

1:Many – A yoga teacher earns credits teaching a yoga class to four other members.

Many:1 – Four members earn credits doing a garden clean-up for a senior.

Many-Many – A whole lot of people earn credits organizing and participating in a community pet-parade.

9 More Examples of Innovative Complementary Currencies

These 9 examples are extracted from the book “[Money and Sustainability](#)” by Sally Goerner, Stefan Brunnhuber, Bernard Lietaer, and Christian Arnspenger.

"Nine examples of innovative motivation systems are presented in this and the next chapter. They can all work in parallel with conventional bank-debt money, use cost-effective electronic media, and should be as transparent as possible to their users. By making these systems more self-policing, such transparency could go a long way towards reducing potential fraud. The systems are presented in order, starting with the easiest and least controversial and ending with the most complex and revolutionary. The first five can be

started privately, either by NGOs or businesses. They are:

- *Doraland: a system proposed for Lithuania, with the purpose of creating a 'Learning Country'. In such a system everybody can volunteer to learn and/or teach, and be rewarded in Doras, a currency whose purpose is to help people realise their dreams. This would best be implemented by an NGO.*

- *Wellness Tokens: an NGO initiative working in cooperation with preventive health care providers to deal with issues even before they arise. Wellness Tokens reward and encourage healthy behaviours and thereby reduce long-term medical expenses for society.*

- *Natural Savings: a financial savings product that is fully backed by living trees. It would be a savings currency with inflation protection superior to that of any national currency, while simultaneously providing an incentive to reforest areas and thereby creating long-term carbon sinks. Another of its qualities: it works well for micro-savings.*

- *C3: a Business-to-Business (B2B) system that reduces unemployment by providing working capital to small and medium-sized businesses. The network's clearing currency would be fully backed by high-quality invoices and convertible into conventional money on demand. The insurance industry and banks both play critical and profitable roles in this system. C3s are working today in Brazil and Uruguay, and the latter country accepts C3s in payment of all taxes.*

- *TRC: the Trade Reference Currency is a global B2B currency proposal that would make it profitable for multinational companies to think long-term, thereby resolving the conflict between short-term financial corporate priorities and long-term social and environmental needs. It would be an inflation-proof and crash-proof global currency fully backed by a basket of commodities and services relevant to the global economy. The TRC would be a global currency distinct from any existing national currency, thus reducing the risk of geopolitical tensions around monetary zones of influence.*

The next four examples of innovative motivation systems are governmental initiatives started at a city, regional or country level. They are:

- *Torekes: a city-based initiative to encourage volunteering while promoting green behaviour and social cohesion in a poor neighbourhood. It has been running since 2010 in the city of Ghent, Belgium.*

- *Biwa Kippu: a proposal for the Biwa Prefecture in Japan to fund the labour components of the ecological restoration and maintenance of Lake Biwa, the oldest and largest lake in Japan. It could be either voluntary or obligatory for households in the area.*

- *Civics: a proposal empowering a city or region to fund civic activities without burdening their budgets. These activities could provide the labour component for social, educational and/or ecological projects. Such a*

system could also take the form of a compulsory contribution.

- *ECOs: a national or Europe-wide system making it possible to fund critical components of large-scale ecological projects, such as climate change prevention and adaptation projects. It would be an interest-free currency issued by governments. Governments would require businesses to make a contribution proportional to their total sales, payable only in ECOs. This is the most controversial of the nine proposals, because it would be seen as a new type of corporate tax on the largest corporations. Such an initiative may require governments to ‘declare war’ on run- away climate change.*

Not all nine systems – five private and four public – have to be implemented before the benefits of different monetary ecosystems start to become visible. Each community, city, region or country can pick and choose which kinds of system it implements. Together with a dozen other designs already in operation around the world, each combination of new exchange media would give an appropriate monetary ecosystem a chance to emerge. Some of these systems will fail. However, just like in a forest, the most successful types will spontaneously tend to spread. We still have much to learn, particularly about which governance structures are most appropriate for each type of system."

For more details on these nine examples, see “[Money and Sustainability](#)” by Sally Goerner, Stefan Brunnhuber, Bernard Lietaer, and Christian Arnspenger.

DeFi Commercial-Purpose Currencies

What Are Commercial-Purpose Currencies?

In short, these are currencies designed to help meet the needs of business, especially small and medium-sized enterprises. They are commodity, merchandise and service-based currencies.

Here is a summary, from the book “[Money](#)” by Thomas Greco:

1. A nonfunded currency is one that is issued on the basis of some exchange transaction or agreement. No assets are held as “cover” by the issuing agency, and the currency is therefore not redeemable, except, of course, in the market, for goods and services.

2. The currency may be issued on the basis of the transfer of value between two parties, one of which (the buyer) is authorized to issue such currency under an agreement with others willing to accept it as payment.[1]

3. The “backing” for a nonfunded currency is simply the formal or implied commitment of the buyer to deliver equal value to someone at some future time in return for the currency that the buyer has created and issued. Thus, she or he “redeems” it by making a sale.

4. As already pointed out, there must be a limit to the amount of currency that each individual party to the agreement can issue. This limit should be

determined by the person's ability to produce, and his or her willingness to deliver valuable goods and services to the community. Experience indicates that the limit should not exceed a value equivalent to his or her normal sales volume within a two- or three-month period.

In contrast, the essential features of a funded currency or credit system are as follows: 1. A funded currency is one that is issued on the basis of the transfer to the issuing agency of some valuable assets held as "cover" or "reserves."

2. These assets are held by the issuing agency against future redemption of the currency. The currency may be redeemable on demand of the holder, or its redemption may be restricted in some way. For example, it may be redeemable only at certain times, or under certain specified conditions, and/or only by certain specified classes of individuals or groups.

3. The assets that are accepted can be in most any form; however, some assets serve the purpose better than others. Historically, gold and silver have often served this purpose, along with government bonds and other securities, or even other currencies. Some "third world" countries use United States dollars as reserves for their national currencies.

4. It is best to use assets that represent value on the way to market or assets that can be easily liquidated in fractional amounts. Thus, the use of real estate or capital equipment is not recommended, unless the rate

of redemption is restricted to conform to the productivity or rate of liquidation of such assets in the normal course of business.

5. One of the usual errors that banks and governments have made is to issue more currency notes than the value of the assets held. This is known as “fractional reserve banking,” which should be avoided.

6. If a currency is made redeemable, it should be backed 100 percent by the assets in which it is to be redeemed. In other words, to be “fully funded,” the amount of currency issued must not exceed the value of the assets held for redemption.

7. If the value of the assets held should decline in terms of some other currency or value measure, the value of the currency itself would decline in relation to that same measure.

8. If some official currency, such as the United States dollar or securities denominated in dollars, is used as backing (reserves) for a funded local currency, then the buying power of the local currency will fluctuate in accordance with the buying power of the official currency.

Using Official Money as Reserves. One of the simplest and most straightforward approaches to issuing a community currency is simply to sell it for official currency. This would be a cash-based currency, such as the gift certificate type or the traveler’s check type discussed above. Again, while such a currency can

be useful for the purpose of funding community improvement projects and promoting “buy local” initiatives, the level of empowerment and independence that it provides is minimal in comparison with community currencies that are “backed” by people’s own labor, resources, and material goods.

The main advantage of a cash-based community currency is that it is easier to establish credibility for it and gain its acceptance by the general community. The primary disadvantage is that such a currency, which requires official money for its existence, will always be dependent on, and limited by, the policies and actions of the monetary authorities that determine its supply and cost.

Using Inventories as Reserves. A better way of issuing a funded currency would be to use the value of inventories as the basis of issue. This approach provides the security of real-value backing while allowing issuance on the basis of local production, cutting the dependence on the availability of official money. Since inventories must be maintained anyway as part of the process of doing business, why not use the value of those inventories to provide a sound medium of exchange? The purpose could be served by most any kind of inventories, including consumer goods in retail shops, manufactured goods in warehouses, even crops in the field, but some types of inventories are more advantageous than others. Basic commodities in inventory would, perhaps, provide the best basis of issue, since they provide the foundational inputs for subsequent stages of production, and they provide as

well an early indicator of the value of manufactured goods on the way to market. They would provide a medium of exchange grounded in reality and subject to all the natural limitations of the physical commodities that the chosen exchange medium represents. The supply of money thus created could become more or less self-regulating, expanding and contracting in step with changes in the supplies of goods available for purchase.

A community currency is intended to provide a medium of exchange that is complementary to official government and central bank currencies. Its primary function is to enable the exchange of goods and services, that is, buying and selling. Another important function of “old-fashioned money” was to provide a way for people to save their current surplus value for use later on. But if the purpose of money is exchange, it should be spent; if the purpose is saving, it should be held. These are mutually contradictory objectives that we must find a way to separate.

- Thomas Greco, “[Money](#)”

Switzerland Proves Complementary Currencies Are a Great Idea

Switzerland enjoys one of the most stable economies and highest standards of living in the world. Factors often cited for the economic wellbeing of this nation

include tourism, chocolates, precision watches, a world-famous banking system, and political neutrality during and following World War II. While each of these may well play a role, a unique, little-known, but very robust complementary currency has also contributed to the country's economic stability for the past 75 years.

*This nation is home to the oldest continuously functioning complementary-currency system in the Western world. Called the WIR, it is a Swiss acronym for *Wirtschaftsring-Genossenschaft*, which roughly translates as "Economic Mutual Support Circle." *Wir* is also the pronoun "we" in German.*

*In the early 1930s, Switzerland was faced with economic woes similar to those of neighboring Germany and Austria. By the time of its inception in 1934, WIR's 16 founding members and many of their clients had received notices from their respective banks that credit lines were going to be reduced or eliminated. Bankruptcy was only a matter of time. Unable to count on the banking sector to obtain the necessary capital during this difficult period, these Swiss businessmen decided to create a mutual credit system among themselves, and invited their clients and suppliers to join. Unlike the afore-mentioned *Wära* and *Wörgl* systems, the Swiss initiative managed to not only survive the period, but continues quite successfully to this very day.*

The WIR provides more than seven decades of experience and demonstrates the degree to which

complementary currencies can assist both individual businesses and the economy-at-large.

When business A makes a purchase from business B, A's account is debited and the corresponding amount is credited to B's account. The unit of account is the WIR, with parity between it and the Swiss franc (one WIR equals one Swiss franc). The currency is designed to serve only as a medium of exchange to facilitate business transactions. WIR accounts do not bear interest and do not serve as a practical store of value.

The WIR ("veer") was devised to counteract the business cycle. This internal currency is used to purchase and sell goods and services from business members within the WIR network, especially when national currency is difficult to come by, as occurs during economic downturns. When banks tighten lending practices, members of the WIR network can simply opt to accept or borrow the readily available WIR complementary currency to continue transacting business, thus diminishing the likelihood of more severe supply or demand side disruptions. Once the economy improves and bank credit is again normalized, WIR members can then shift back once again to the national currency. In essence, the issuance of WIR currency expands and contracts countercyclically with the Swiss franc economy.

The countercyclical function of the WIR provides an important macroeconomic advantage not only to WIR members but also to the Swiss economy as a whole. A notable quantitative study on the WIR's

macroeconomic impact was conducted by Dr James P. Stodder, professor at the Lally School of Management and Technology at Rensselaer Polytechnic Institute. Dr Stodder's study concluded that: "Growth in the number of WIR participants has tracked Swiss unemployment very closely, consistently maintaining a rate of about one-tenth the increase in the number of unemployed." [269]

Simply stated, the study showed that the WIR system contributed significantly to the stability of the Swiss economy and to its low unemployment rates. When the conventional Swiss franc economy slows, more people and firms participate in the WIR economy, thus demanding fewer disruptions to business and far fewer layoffs. The WIR functions as a powerful stabilizing mechanism that limits the severity of the business cycle and the inevitable ups and downs of the economy.

Professor Tobias Studer, from the Center of Economic Studies at Basel University, Switzerland, considers the Stodder research a breakthrough. He reports: For the first time, an independent American researcher has arrived at a surprising conclusion: far from representing a factor of disturbance for the national monetary policy, the credits created by WIR constitute a support of the National Bank [the Swiss central bank] in pursuit of its monetary policy objectives. [270]

It bears noting that the WIR's contributions to both the economy and the banking sector were not always

so well appreciated. When operations first began in the 1930s, the WIR was erroneously viewed as a direct threat to the banking system's hegemony, and, prompted a similar response to those taken by the central banks in neighboring Germany and Austria at the time (against the Wära and Wörgl, respectively). The Swiss banks proceeded to mount an aggressive press campaign to stop this complementary currency initiative from occurring. Miraculously, their hostile efforts failed.

In the first three months of operations, the WIR attracted 1,700 participants. Within a year, more than 3,000 businesses made use of this complementary-currency system, and were linked with one another by a catalog of 850 unique categories of goods and services. A cooperative was established to track WIR user accounts, which soon allowed participants to borrow WIR at the low interest rate of 1-1.5 percent. These loans, similar to those issued by a conventional bank, were backed by inventory, real estate, and other hard assets. The system was ultimately credited with saving many of the businesses involved.[271]

The system remains fully operational today, with more than 65,000 members participating in WIR nationally. This represents nearly one quarter of all Swiss businesses. In 2006, trading volume in WIRs was 1.67 billion Swiss francs (\$1.4 billion).[272] WIR owns its own bank that operates in both Swiss francs and WIR, with six regional offices that conduct business in four languages.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

BarterCard: A Modern Example

If you have never heard of BarterCard, I wouldn't blame you. As a kid growing up in Kenya, I remember seeing adverts of it on the media. It looked like a credit card but without the magnetic strip at the back. Then the ads disappeared. I forgot about it. Then, here in Australia, by pure chance, I realized it was still active to this day, just that it was no longer advertised as it used to be on national media when I was a kid. It is a great case study of a type of commercial-purpose currency.

The following is quoted from <https://bartercard.com.au/how-bartercard-works/>.

Why barter in business?

Business owners love bartering because it saves them cash; moves excess stock or idle inventory and fills up their downtime or spare capacity. Chances are you have conducted a one-to-one barter deal in the past and the outcome was win-win.

However, while these traditional barter deals can be effective, they lack flexibility, which limits how often they may occur. The challenge with a direct one-on-one barter is you might want something that one business has but they may not want what you have. By creating a currency of trade dollars you can trade conveniently with tens of thousands of members worldwide.

How does it work?

Bartercard has created a flexible, secure and fully accountable way for businesses to trade their goods and services with businesses all around the country and the world. Bartercard is one of the largest B2B networks with over 32,000 cardholders across Australia and New Zealand alone who are now effectively using the trade exchange to...

- gain new customers, who generate increased sales income*
- move excess stock or utilise downtime*
- free up cash to pay existing expenses*
- increase profits from introduction of new business.*

Using Bartercard

By using Bartercard you earn trade dollars for the goods and services you sell and this value is recorded electronically in your member account (similar to a bank account).

You then spend your credit balance (or use your advance on trade dollar sales) on goods or services from any other Bartercard member. It offers you completely flexible trading because...

- you don't have to purchase from the same business that purchases from you

- you can spend with anyone locally, nationally and internationally

- you can sell now and buy later, or buy now and sell later

- and...you can use the advance on your trade dollar sales as working capital, even before making a sale.

Imagine setting up a similar system using the power of DeFi.

The Wära, a Historical Example from Germany

Up until hyperinflation, the largest employer and economic mainstay of Schwanenkirchen had been the local coalmine. But like many other businesses in Germany during the 1920s, it was forced to file for bankruptcy. Operations were shut down and the coalmine went on sale for 8,000 reichsmarks, far below its estimated value.

One former production engineer wanted to purchase the mine, but could not get a bank loan. Max Hebecker instead decided to apply the concept of the Gesell-inspired Wära stamp. Hebecker gathered the miners, local shopkeepers, and others that would be affected by

the new local currency. He explained to all that the coalmine could be reopened, but only if each were willing to accept payment in Wära scrip in replacement of the virtually worthless national currency. The coal inventory extracted from the mine would provide the backing for the scrip. Following a lively exchange, all parties finally agreed.

The decision to accept the complementary currency turned out to be economically very sound. During a time when many other businesses and communities in Germany were struggling to survive, the Wära not only saved the coalmine and revitalized the local economy, but also began to circulate nationally.

Over 2,000 businesses throughout Germany were soon accepting and paying one another with Wära scrip. Many banks even opened Wära accounts. The Wära's great success, however, also turned out to be its downfall.

Germany's central bank, the Reichsbank, grew concerned over the popularity of the Wära and other local currencies then in circulation. The relief to businesses during the difficult downturn, and the longer-term potential benefits provided by these complementary currencies to the national economy (and to the banking system itself), were outweighed by their perceived threats to the hegemony in the issuance of money by the central bank. Consequently, in October 1931, by legislative action through the "Brüningsche Notverordnungen," (Brüning's Emergency Regulations, named after Heinrich Brüning, then Germany's Reichs-

chancellor and foreign minister), the Wära and other complementary currencies were declared illegal in Germany.

Two years following the banishment of complementary currencies, as the economy continued to plummet, a dramatic shift took hold of the German political landscape.

The repression of complementary currencies, together with other antiinflationary decisions by the Reichsbank, led to a sharp decline in the German money supply.[165] This resulted in the shut down of the Schwanenkirchen mine and hundreds of other businesses. Unemployment thus soared once again.

Given that the reigning monetary monopoly made it increasingly more difficult for people to help themselves on a local level, advocates of centralized solutions gained appeal. In the beer halls of Bavaria, an obscure Austrian immigrant began drawing audiences to his fiery speeches, with promises of a return to jobs and glory. His name was Adolph Hitler.

It is often forgotten that until the monetary collapse of the 1920s and the takeover by the Nazis, Germany was among the most advanced, educated, and cultured nations on Earth. Outlawing well-designed local currencies likely contributed to the tragic events of that period.

The lessons of Germany, Austria, and many other nations serve as important historical reminders for us

all. Money matters are intrinsically linked to many important societal concerns.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

That is another example that can be revived and re-engineered to work even better using DeFi.

Credit Clearing Systems, An Example

As early as 1914, Hugo Bilgram and L. E. Levy proposed a “credit clearing” system. They introduced their plan with the following statement: Were a number of businessmen to combine for the purpose of organizing a system of exchange, effective among themselves, they could clearly demonstrate how simple the money system can really be made. The greater the number of businessmen that would thus cooperate, the more complete would be their own emancipation from the obstruction to commerce and industry which existing currency laws impose.

The plan that Bilgram and Levy outlined was basically as follows:

- 1. A group of businesspeople would agree to settle their business accounts through a “clearing system,” using their own credit as a medium of exchange.*

2. The method of clearing accounts would be, in the main, similar to that used by depository banks to clear accounts among its depositors. Each business association would open an account for each of its members.

3. Each member would then furnish "thoroughly acceptable and amply adequate" security for the amount of credit he or she wished to establish.

4. The security would be held by the association as a pledge to cover the "credit cheques" that the member might draw in excess of deposits, that is, to secure his or her debit balance.

5. Such "credit cheques" would be accepted by all members of the association in payment of business accounts. The amount of the check would be credited to the payee's account (causing it to increase), and the same amount would be debited to the payer's account (causing it to decrease).

6. Official currency and checks would be deposited to the account also, with the stipulation that only system credits, not official money, could be paid out or withdrawn from the account.

7. Members with net credits would be allowed to redeem a certain portion of them, say 20 percent each month, for official currency. This, of course, would require those with debits to provide the official currency for such redemptions.

8. *Such associations in various localities could be federated to provide for interregional clearing of credits.*

- Thomas Greco, "[Money](#)"

Another example that can be revived and re-engineered to work even better using DeFi.

More Use-Case Examples

Newly harvested grain, for example, might be deposited in a "grain bank" or warehouse, and new currency would be issued to the farmers in return for their warehouse receipts. The farmers would then be able to spend that currency into circulation. When the grain is finally sold to a miller, say, the miller would pay for it by using community currency acquired in the market. He would first buy the warehouse receipt, then take it to the warehouse, where he would exchange it for the actual grain. That currency then would be extinguished. Having done its job, it is taken out of circulation. The process is shown pictorially in figure 20.1. This is what happens, step-by-step: 1. A farmer takes a load of wheat and deposits it in the bonded warehouse.

2. The warehouse, in return, gives the farmer a receipt showing the physical quantity of wheat deposited.

3. The farmer then takes the warehouse receipt and gives it to a mercantile (or co-op) bank.

4. The mercantile bank, in return, credits the farmer's community currency checking account or gives the farmer paper community currency notes.

5. The farmer now has a spendable exchange medium, which he or she uses to make purchases from any of the various merchants and traders who have agreed to accept the community currency.

6. They, in turn, spend the currency by making purchases from other participating merchants and traders.

7. Such exchanges between traders can occur many times, but eventually the community currency will find its way into the hands of someone who wants to buy the wheat, say, a miller. The miller then takes the currency to the mercantile bank and uses it to buy the warehouse receipt.

8. The miller then takes the receipt to the warehouse and claims the wheat.

Note, in figure 20.1, that the warehouse receipt makes a complete circuit. It was issued by the warehouse to the farmer when he or she deposited wheat in the warehouse. The farmer then exchanged the receipt for credits or currency notes at the mercantile bank. The miller bought the warehouse receipt from the mercantile bank using community

currency notes or credits acquired from the market in the course of his or her usual business of selling flour and other wheat products. The miller then took the receipt to the warehouse that originally issued it, where he or she exchanged it for the actual wheat. The warehouse receipt, having done its job, and having arrived back at its point of origin, is canceled or destroyed.

- Thomas Greco, "[Money](#)"

When an economic entity such as a railway must pay for what it needs in official currency, it must first acquire the currency to get what it needs. Alternatively it might purchase what it needs on credit in anticipation of having the cash it needs to pay at the time the bill comes due. However, in doing this, it commits itself to deliver something (money) that it only hopes to obtain. As Zander points out: Whether its hope will materialize is uncertain. The undertaking to pay at maturity contains, therefore a speculative element, which is particularly hazardous in times of depression. But the railway can promise to pay something else, namely, to transport commodities and persons; that is to fulfill its function as a railway. There is nothing speculative about that. The means required for this, rolling stock and other plant, are available. This is therefore fundamentally different from a promise to pay cash at a future date, for in the latter case the means of payment have yet to be secured, and this by

having transported passengers and goods. The capacity of the railway to act as a carrier is, on the contrary, unquestionable.

The Zander plan includes the following essential features: 1. The railway makes payment for the goods and services it buys, not in legal tender (central bank notes), but in transport certificates.

2. The railway certifies that it will accept the certificates at their face value like ready money, in payment for its services.

3. The certificates are made out to the bearer.

4. They are issued in convenient denominations.

5. No one is forced to accept them.

6. They have no legal value.

7. The market rate of the certificates in relation to official currency is freely determined by the market.

The primary feature assuring that the certificates will maintain their value is the commitment of the railway to accept them at any time at their face value, regardless of their market rate.

- Thomas Greco, "[Money](#)"

The Commercial Credit Circuit (C3), like the WIR, provides another option for needed liquidity, and at more reasonable costs than are typically available. This is accomplished by forming a credit circuit among SMEs, their customers, and suppliers, with the addition of an insurer. For a small cost, the insurer underwrites the business deal to guarantee that all parties involved with a business transaction will receive payment.

Unlike the WIR, any transaction using C3 is fully convertible at any time into national money, allowing this currency system to more easily attract business entities that might otherwise shy away from a complementary means of payment.

Let us say that a theatre seat manufacturer receives an order for 100,000 seats from a reputable firm, who will pay for the seats by check on delivery. The manufacturer (business A) has its own workers to produce the seats, and a supplier for the requisite materials (business B). Everything is in place to make the deal happen except for the money needed to pay workers and business B. Normally, business A would have to go to a bank for a bridge loan for this situation, which, depending on factors such as the business climate at the time, may or may not be successful. With C3, the needed financing is available in another way.

The process uses insured invoices or other payment claims as liquid payment instruments within a business-to-business clearing network. Each recipient of the liquid payment instrument has the choice to either convert it into national money (at a cost), or directly pay its own suppliers with the proceeds of the insured invoice.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Those are more examples that can be revived and re-engineered to work even better using DeFi.

DeFi Trade Reference Currencies

Global reference currencies would be designed to address many of the limitations inherent in today’s international financial system.

Obviously, this is a vast and complex topic, so once again, here is a taste to get you started, this time from [“New Money for a New World”](#) by Bernard Lietaer and Stephen Belgin.

The dollar’s use as a global reserve currency gives the United States a particular advantage as the only country today that can afford a permanent deficit in its trade. This is because central banks are obliged to accept dollars under the current rules of the IMF. Such an advantage, however, should not be considered a permanent status. This same torch was passed from Britain to America after World War II. Some people claim that it may well soon pass, in turn, to China.

Such transitions often incur friction, and fights for monetary zones of influence usually provoke damage. The most dangerous period occurs during the decline of a hegemonic power whereby the old guard no longer commands enough power to impose its own solution, but still retains sufficient influence to block any solution proposed by others. This is the situation we find ourselves in today. If a dollar crisis should erupt, the most likely outcome will be a fragmentation of the global system into three monetary zones: a dollar-dominated zone in the Western hemisphere, a European-dominated zone, and an Asian zone (still under preparation). We might expect high volatility between these monetary zones, even more than what is presently taking place with national currencies. It is also likely that foreign exchange controls will materialize between these zones, which will be costly and otherwise problematic. None of this is advantageous or conducive to peaceful economic and political evolution.

The introduction of the global [Terra Trade Reference Currency \(TRC\)](#)³⁰ avoids a major potential source of conflict, while solving important problems for all those businesses and other entities that depend on easy and efficient global commercial exchanges.

Introducing a special-purpose global currency resolves several other key issues of particular importance today. Contrary to what takes place with conventional money, the Terra would spontaneously operate countercyclically with the business cycle and

³⁰ https://www.changemakers.com/sites/default/files/Terra_WhitePaper_final.pdf

contribute to the stabilization of the world economy. Perhaps most importantly, the Terra is designed to give multinational corporations a strong incentive for long-term thinking.

Given the stakes that are involved and the current financial instability, we believe this to be a timely and vital proposal.

Even with the detail given here, this chapter should be considered a mere overview. For those interested in a deeper understanding, please consult the [White Paper available for download on dedicated web sites](#).

The Terra is based on fundamentally distinct principles from conventional, bank-debt issued money. Key differences include: The Terra is 100 percent asset-backed, while conventional money is backed by nothing except the belief that other people will accept it. Therefore, by definition, there can never be fractional reserve Terras, and the supply of Terras does not rise or fall with the expansion or contraction of bank credit. The Terra's assets consist of a balanced basket of a dozen of the most representative commodities and services in the world economy. This global reference currency thereby offers a natural inflation hedge. The Terra, like the WIR and C3, is naturally countercyclical and therefore helps stabilize the economy. Conventional money creation tends to be naturally procyclical, that is, it accentuates the repeated booms and busts that destabilize the economy, even as central banks try to counteract this phenomenon. The Terra does not bear interest. It instead has a demurrage charge of 3.5-4

percent per year (to cover the cost of storage of the commodities backing the Terra). The Terra is therefore only a trading and contractual instrument, not a store of value. The Terra therefore encourages trading, while conventional money encourages accumulation. The Terra is managed by the Terra Alliance, while conventional money is managed by central banks. The alliance doesn't decide when to create or redeem Terras; member participants make such decisions.

Four types of entities participate in the Terra system: Terra backers, Terra users, commodities/futures markets, and the Terra Alliance itself. In addition, other organizations or individuals may piggyback off the Terra system, using it simply as a contractual reference unit without participating in the system itself.

The Terra Alliance operations are now examined.

A member with excess inventory of one of the commodities comprising the Terra, can sell such inventory to the Alliance. By triggering the issuance of the Terra as an inventory receipt (which is paid for and denominated in Terras), that member is then functioning as a Terra Backer. This is how Terras come into being. They are in a sense, warehouse receipts, which are an historically very old form of money.

A Terra Unit is a claim against a portion of the asset holdings of the Terra Alliance. The Alliance warehouses large quantities of the commodities comprising the Terra. These quantities always equal, in total, the

amounts necessary to redeem all of the Terra units in existence.

To use a simplified example, suppose there were 100 Terra units in existence and each unit represented 1 ounce of gold, plus 1 pound of copper and 1 bushel of wheat. In that case, the Terra Alliance would warehouse 100 ounces of gold, 100 pounds of copper, and 100 bushels of wheat at all times.

Taking a more realistic example, suppose that an oil-producing member decides to sell 1 million barrels of crude oil to the Terra Alliance in exchange for Terras. Given that crude oil is one component of the Terra “basket,” the Terra Alliance will use commodities markets to sell enough of the oil and buy enough of the other 11 components such that all 12 components are once again equally represented in the Terra basket.

Once Terras are brought into existence, they can be bought and sold like any other form of money or commodity. There is, however, a demurrage charge on Terra holdings, at a rate of approximately 3.65 percent per year. Stated differently, a time penalty on keeping Terras is being charged at the rate of about one hundredth of one percent (.01 percent) per day. Due to the electronic nature of the Terra and the power of modern computers, this parking fee can be allocated between the traders precisely based on how long they held onto the Terra units, even down to the minute. This inflation protected currency therefore offers a permanent incentive to encourage trading with it. Each

entity accepting a payment in Terra becomes one of the Terra Users.

When members decide for whatever reason to redeem Terras for national currency, they need only present their Terras to the Terra Alliance. They thereby become the “final user.” When such a redemption request is made, the Terra Alliance will sell a sufficient portion of its basket to generate the cash needed to cover the redemption, and the final user pays a 2 percent transaction fee. This fee aims at discouraging the cashing of Terras for conventional money. The Alliance will then pay out the proceeds in conventional money through participating banks.

There is a last group of parties who will benefit from the existence of Terras, even though they may never have any dealings with the Alliance, or even may never actually own Terras — piggy-backers. Not wishing to be tied to the vagaries of a particular national currency, they could simply use the Terra as a trade reference currency, pricing contracts in it but settling those contracts in an equivalent amount of some other national currency, as agreed upon contractually with the other party.

More sophisticated implementations of the Terra can include in the “model Terra basket” claims for future services, and even artificial assets such as carbon emission rights. Theoretically, any product or service could be included in the basket at the condition that it can be standardized and that a corresponding futures market can be organized.

The benefits include: 1. a more level playing field among nations; 2. lower costs of international business; 3. increased investment in Less Developed Countries (LDCs) that are resource-rich yet infrastructure-poor; 4. improved stability of the global economy; 5. protection against inflation; 6. a shift from short-term to longer term planning.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Bitcoin-Backed Banks, Legal Tender & Networks (Plus the El Salvador Case Study)

"Actually there is a very good reason for Bitcoin-backed banks to exist, issuing their own digital cash currency, redeemable for bitcoins. Bitcoin itself cannot scale to have every single financial transaction in the world be broadcast to everyone and included in the block chain. There needs to be a secondary level of payment systems which is lighter weight and more efficient. Likewise, the time needed for Bitcoin transactions to finalize will be impractical for medium to large value purchases. Bitcoin-backed banks will solve these problems. They can work like banks did before nationalization of currency. Different banks can have different policies, some more aggressive, some more conservative. Some would be fractional reserve while others may be 100% Bitcoin backed. Interest

rates may vary. Cash from some banks may trade at a discount to that from others. I believe this will be the ultimate fate of Bitcoin, to be the “high- powered money” that serves as a reserve currency for banks that issue their own digital cash.”

- Hal Finney

[Lightning Network](#)³¹ is a technological enhancement to Bitcoin that positively transforms it from a slower-moving commodity like physical gold to a currency moving at lightspeed. And the key ingredient to the Lightning Network is the smart contract. Generally, smart contracts are programmable agreements capable of anything that can be coded into software. For the objective of Bitcoin, smart contracts are most importantly capable of escrow and multiple-party coordination. The smart contracts in Lightning Network, Hashed TimeLock Contracts (HTLCs), have scaled Bitcoin into a monetary network capable of processing millions of transactions per second.

- Nik Bhatia, “[Layered Money](#)”

Let’s review transactions speeds:

³¹ <https://lightning.network/>

- VISA/MasterCard: 24,000 transactions per second (tps)
- Bitcoin: 7 tps
- Bitcoin Cash: 61 tps
- Solana: 50,000 tps
- Ethereum 2.0: 100,000 tps
- Lightning Network + Bitcoin: **1,000,000 tps**

Bitcoin by itself is way too slow.

But linked with Lightning Network, it is the fastest by far.

Transaction fees also drop. The base fee per transaction is 1 satoshi (0.00000001 BTC), equivalent to **\$0.04 cents**.

And this is the solution that El Salvador used to become the world's first country to have Bitcoin as it's legal tender in June 2021.

This is not an ideal solution for most countries, but it is an arguably good solution for some countries, especially the ones that rely heavily on remittances and have many unbanked people.

Why?

In 2019, migrants collectively sent \$550.5 billion in money back to their home countries—money transfer flows that are also known as remittances.³² Look at this chart showing which countries receive the highest remittances:

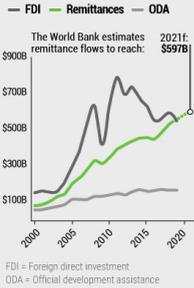
³² <https://www.visualcapitalist.com/global-remittance-flows/>

Which Countries Receive the Most Remittances?

Remittances—money sent by migrant workers back to their home countries—are overtaking flows of foreign direct investment in low and middle-income countries.

Global Remittance Flows

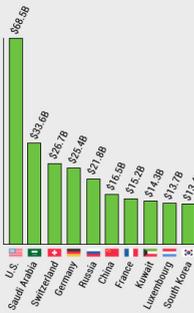
2000-2021



Which major countries do these remittances originate from?

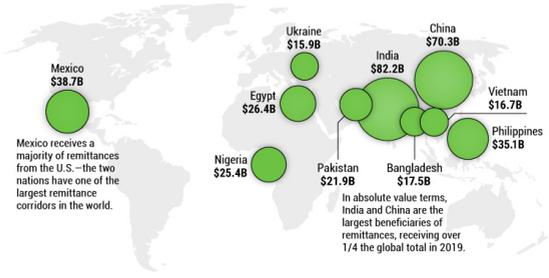
Top Remittance Outflows

2018



Top Remittance Recipients, by Amount

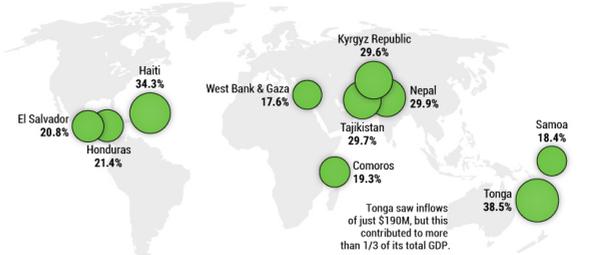
USD, 2019e



Where do these billions of dollars go? Depending on what you measure, the countries most reliant on remittances change significantly.

Top Remittance Recipients, as a % of GDP

USD, 2019e



Source: World Bank, Migration and Remittances Annual Data (Oct 2019)



IMAGE SOURCE: [HTTPS://WWW.VISUALCAPITALIST.COM/GLOBAL-REMITTANCE-FLOWS/](https://www.visualcapitalist.com/global-remittance-flows/)

El Salvador's incoming remittances account for almost 21% of its GDP.

Plus, 70% of its population doesn't have bank accounts.

Next, look at this Forbes article entitled “[El Salvador Enacts Bitcoin Law, Ushering In New Era Of Global Monetary Inclusion](https://www.forbes.com/sites/theapothecary/2021/06/09/el-salvador-enacts-bitcoin-law-ushering-in-new-era-of-global-monetary-inclusion/?sh=79dd71635bcb)”³³. Some snippets from that article:

*... A bitcoin currency standard, undergirded by the Lightning Network, enables Salvadorans living in the U.S. and elsewhere to send money home without the significant fees common with Western Union and other international transmitters. **If all Salvadoran emigrés were to use the Lightning Network for remittances, an additional \$1 billion could flow into El Salvador’s economy each year...***

... In addition, smartphone frontends like Strike enable easy transmission of funds, denominated in dollars or bitcoin, for everyday purchases like groceries. As noted above, under the new Salvadoran system, merchants can instantly re-convert the received bitcoin back into dollars, or keep bitcoin on their accounts if they prefer...

...Once El Salvador demonstrates that bitcoin is usable in this way—in a low-income country where 70 percent of the residents lack bank accounts—the nation will have proven that bitcoin is usable everywhere, including in the United States...

In response to El Salvador’s bitcoin moves, politicians in several other Latin American countries

³³ <https://www.forbes.com/sites/theapothecary/2021/06/09/el-salvador-enacts-bitcoin-law-ushering-in-new-era-of-global-monetary-inclusion/?sh=79dd71635bcb>

expressed their desire to bring a bitcoin standard to their countries. The first was Carlitos Rejala of Paraguay, who hinted on Twitter that Paraguay was working with PayPal on such a project.

Panama legislator Gabriel Silva followed, tweeting, “This is important. And Panama cannot be left behind. If we want to be a true technology and entrepreneurship hub, we have to support cryptocurrencies. We will be preparing a proposal to present at the [legislative] Assembly. If you are interested in building it, you can contact me.”

Legislators from Brazil, Mexico, Colombia, and Argentina [soon followed](#). None of these figures has the same influence in their governments as President Bukele does in El Salvador, but some of them may very well succeed at following El Salvador’s lead, effectively creating a multinational consortium of countries deploying bitcoin as legal tender.

Even if other countries don’t follow El Salvador’s lead, the fact that a single sovereign nation state would adopt bitcoin as legal tender is of great consequence.

This is how life was before this solution:

Current Option using Western Union: Son living in USA drives to Western Union Office and pays \$7 fee. Mom in El Salvador has to pay to take the bus an hour away and retrieve the money. Cost to son \$7 plus an

hour of his time. Cost to mom \$2 in bus fare and 4 hours of her time plus the risk of traveling on bus with money.

And this is how life is after this solution:

New Option using Bitcoin + Lightning Network: Son uses the new phone app linked to his US bank account to send \$100 in BTC over Lightning network. Cost to son almost \$0 and 3 minutes of his time. Cost to mom \$0 and receives payment immediately, directly to her phone. She can buy milk from the local store that accepts Bitcoin (even sending payment directly from her phone sitting in her house and having someone deliver.) She can also pay her electric bill without leaving home, or walk down the street and eat at the local restaurant. The \$7 fee and \$2 bus fare mean the transaction costs using Western Union would be 9%, and more importantly a big waste of time and effort. Bitcoin over the Lightning Network fixes this.

I'd encourage you to [watch](#)³⁴, [listen or read](#)³⁵ the full interview with El Salvador's president on this matter, it is very interesting.

And here is [how they wrote the law for it](#)³⁶, very simple:

³⁴ https://www.youtube.com/watch?v=qdx_alPrmVY

³⁵ <https://www.whatbitcoindid.com/wbd363-president-nayib-bukele>

³⁶ <https://freopp.org/el-salvadors-bitcoin-law-full-proposed-english-text-9a2153ad1d19>

THE LEGISLATIVE ASSEMBLY OF THE REPUBLIC OF EL
SALVADOR

CONSIDERING:

That in accordance with Article 102 of the Constitution of the Republic, the State is under the obligation to promote and protect private enterprise, generating the necessary conditions to increase national wealth for the benefit of the greatest number of inhabitants.

That under Legislative Decree No 201, published in Official Gazette number 241, Volume 349, dated December 22, 2000, the United States dollar was adopted as legal tender.

That approximately seventy percent of the population does not have access to traditional financial services.

That it is the obligation of the state to facilitate the financial inclusion of its citizens in order to better guarantee their rights.

That in order to promote the economic growth of the nation, it is necessary to authorize the circulation of a digital currency whose value answers exclusively to free-market criteria, in order to increase national wealth for the benefit of the greatest number of inhabitants.

That according to the previous considerations, it is essential to issue the basic rules that will regulate the legal course of bitcoin.

THEREFORE,

DECREES the following:

BITCOIN LAW

*CHAPTER I
GENERAL DISPOSITIONS*

Art. 1. The purpose of this law is to regulate bitcoin as unrestricted legal tender with liberating power, unlimited in any transaction, and to any title that public or private natural or legal persons require carrying out.

What is mentioned in the previous paragraph does not hinder the application of the Monetary Integration law.

Art. 2. The exchange rate between bitcoin and the United States dollar, subsequently USD, will be freely established by the market.

Art. 3. Prices may be expressed in bitcoin.

Art. 4. Tax contributions can be paid in bitcoin.

Art. 5. Exchanges in bitcoin will not be subject to capital gains tax, just like any legal tender.

Art. 6. For accounting purposes, the USD will be used as the reference currency.

Art. 7. Every economic agent must accept bitcoin as payment when offered to him by whoever acquires a good or service.

Art. 8. Without prejudice to the actions of the private sector, the State shall provide alternatives that allow the user to carry out transactions in bitcoin and have automatic and instant convertibility from bitcoin to USD if they wish. Furthermore, the State will promote the necessary training and mechanisms so that the population can access bitcoin transactions.

Art. 9. The limitations and operations of the alternatives of automatic and instantaneous conversion from bitcoin to USD provided by the State will be specified in the Regulations issued for this purpose.

Art. 10. The Executive Branch will create the necessary institutional structure to apply this law.

FINAL AND TRANSITIONAL PROVISIONS

Art. 11. The Central Reserve Bank and the Superintendency of the Financial System shall issue the corresponding regulations within the period mentioned in Article 16 of this law.

Art. 12. Those who, by evident and notorious fact, do not have access to the technologies that allow them to

carry out transactions in bitcoin are excluded from the obligation expressed in Art. 7 of this law. The State will promote the necessary training and mechanisms so that the population can access bitcoin transactions.

Art. 13. All obligations in money expressed in USD, existing before the effective date of this law, may be paid in bitcoin.

Art. 14. Before the entry into force of this law, the State will guarantee, through the creation of a trust at the Banco de Desarrollo de El Salvador (BANDESAL), the automatic and instantaneous convertibility of bitcoin to USD necessary for the alternatives provided by the State mentioned in Art. 8.

Art. 15. This law will have a special character in its application concerning other laws that regulate the matter, repealing any provision that contradicts it.

Art. 16. This decree will take effect ninety days after its publication in the Official Gazette.

GIVEN AT THE BLUE HALL OF THE LEGISLATIVE PALACE: San Salvador, on the 8th day of June 2021.

It is worthwhile considering DeFi solutions that are backed by Bitcoin. For some use cases, this is a great idea. After all, bitcoin already has tremendous and proven value, strength, and recognition. It is arguably stronger than any fiat currency system on the planet.

Ralph Merkle, inventor of the Merkle tree data structure, which is utilized by Bitcoin to record transactions, had a remarkable way of describing Bitcoin: Bitcoin is the first example of a new form of life. It lives and breathes on the internet. It lives because it can pay people to keep it alive. It lives because it performs a useful service that people will pay it to perform. It lives because anyone, anywhere, can run a copy of its code. It lives because all the running copies are constantly talking to each other. It lives because if any one copy is corrupted it is discarded, quickly and without any fuss or muss. It lives because it is radically transparent: anyone can see its code and see exactly what it does.

It can't be changed. It can't be argued with. It can't be tampered with. It can't be corrupted. It can't be stopped. It can't even be interrupted.

If nuclear war destroyed half of our planet, it would continue to live, uncorrupted. It would continue to offer its services. It would continue to pay people to keep it alive.

The only way to shut it down is to kill every server that hosts it. Which is hard, because a lot of servers host it, in a lot of countries, and a lot of people want to use it.

Realistically, the only way to kill it is to make the service it offers so useless and obsolete that no one wants to use it. So obsolete that no one wants to pay

for it. No one wants to host it. Then it will have no money to pay anyone. Then it will starve to death.

But as long as there are people who want to use it, it's very hard to kill, or corrupt, or stop, or interrupt.

Bitcoin is a technology that survives for the very same reason the wheel, knife, phone, or any technology survives: it offers its users benefits from using it. Users, miners, and node operators are all rewarded economically from interacting with Bitcoin, and that is what keeps it going. It's worth adding that all the parties that make Bitcoin work are individually dispensable to its operation. Nobody is essential to Bitcoin, and if anybody wants to alter Bitcoin, Bitcoin is perfectly capable of continuing to operate as it is without whatever input anyone has on this. This will help us understand the immutable nature of Bitcoin in Chapter 10, and why attempts at making serious changes to the Bitcoin code will almost inevitably lead to the creation of a knockoff version of Bitcoin, but one that cannot possibly recreate the economic balance of incentives that keeps Bitcoin operational and immutable.

Bitcoin can also be understood as a spontaneously emergent and autonomous firm which provides a new form of money and a new payments network. There is no management or corporate structure to this firm, as all decisions are automated and preprogrammed. Volunteer coders in an open source project can present changes and improvements to the code, but it is up to users to choose to adopt them or not. The value

proposition of this firm is that its money supply is completely inelastic in response to increased demand and price; instead, increased demand just leads to a safer network due to the mining difficulty adjustment. Miners invest electricity and processing power in the mining infrastructure that protects the network because they are rewarded for it. Bitcoin users pay transaction fees and buy the

With this technological design, Nakamoto was able to invent digital scarcity. Bitcoin is the first example of a digital good that is scarce and cannot be reproduced infinitely. While it is trivial to send a digital object from one location to another in a digital network, as is done with email, text messaging, or file downloads, it is more accurate to describe these processes as copying rather than sending, because the digital objects remain with the sender and can be reproduced infinitely. Bitcoin is the first example of a digital good whose transfer stops it from being owned by the sender.

Beyond digital scarcity, Bitcoin is also the first example of absolute scarcity, the only liquid commodity (digital or physical) with a set fixed quantity that cannot conceivably be increased. Until the invention of Bitcoin, scarcity was always relative, never absolute. It is a common misconception to imagine that any physical good is finite, or absolutely scarce, because the limit on the quantity we can produce of any good is never its prevalence in the planet, but the effort and time dedicated to producing it. With its absolute scarcity Bitcoin is highly salable across time. This is a

critical point which will be explicated further in Chapter 9 on Bitcoin's role as a store of value.

It had always been theoretically possible to produce an asset with a predictably constant or low rate of supply growth to allow it to maintain its monetary role, but reality, as always, had proven far trickier than theory. Governments would never allow private parties to issue their own private currencies and transgress on the main way in which government funds itself and grows. So government would always want to monopolize money production and face too strong a temptation to engage in the increase of the money supply. But with the invention of Bitcoin, the world had finally arrived at a synthetic form of money that had an ironclad guarantee governing its low rate of supply growth. Bitcoin takes the macroeconomists, politicians, presidents, revolutionary leaders, military dictators, and TV pundits out of monetary policy altogether. Money supply growth is determined by a programmed function adopted by all members of the network. There may have been a time at the start of this currency when this inflation schedule could have been conceivably changed, but that time has well passed. For all practical intents and purposes, Bitcoin's inflation schedule, like its record of transactions, is immutable. While for the first few years of Bitcoin's existence the supply growth was very high, and the guarantee that the supply schedule would not be altered was not entirely credible, as time went by the supply growth rate dropped and the credibility of the network in maintaining this supply schedule has increased and continues to rise with each passing day in which no serious changes are made to the network.

The bitcoin supply will increase by 27% in the coming 25 years, whereas the supply for gold will increase by 52%, the Japanese yen by 64%, the Swiss franc by 169%, the U.S dollar by 272%, the euro by 286%, and the British pound by 429%. This exposition can help us appreciate the salability of bitcoin and how it fulfills the functions of money. With its supply growth rate dropping below that of gold by the year 2025, Bitcoin has the supply restrictions that could make it have considerable demand as a store of value; in other words, it can have salability across time. Its digital nature that makes it easy to safely send worldwide makes it salable in space in a way never seen with other forms of money, while its divisibility into 100,000,000 satoshis makes it salable in scale. Further, Bitcoin's elimination of intermediary control and the near-impossibility of any authority debasing or confiscating it renders it free of the main drawbacks of government money. As the digital age has introduced improvements and efficiencies to most aspects of our life, Bitcoin presents a tremendous technological leap forward in the monetary solution to the indirect exchange problem, perhaps as significant as the move from cattle and salt to gold and silver.

- Saifedean Ammous, "[The Bitcoin Standard](#)"

"Imagine if the population were to discover, through real life experience, what it is to conduct their lives with a currency that does not lose its value, but in reality

gains in value. As our economy grows and as our manufacturing capabilities increase, prices go down. The only reason that prices are not going down today—except in products where improvements are very rapid (e.g., computers)—is because of government-caused currency inflation.”

- Satoshi, [“The Book Of Satoshi: The Collected Writings of Bitcoin Creator Satoshi Nakamoto”](#)

“The nature of Bitcoin is such that once version 0.1 was released, the core design was set in stone for the rest of its lifetime.”

- Satoshi Nakamoto

“Being open source means anyone can independently review the code. If it was closed source, nobody could verify the security. I think it’s essential for a program of this nature to be open source.”

- Satoshi Nakamoto

The underlying thesis of this book is that BTC will stand alone on the first-layer of money in the future. If only one word about Bitcoin could be used to describe why, we'd have to choose one coined only a few years ago in 2014 by author and seminal economic thinker Nassim Nicholas Taleb: antifragile. Here is how Taleb defined it:

Some things benefit from shocks; they thrive and grow when exposed to volatility, randomness, disorder, and stressors and love adventure, risk, and uncertainty. Yet, in spite of the ubiquity of the phenomenon, there is no word for the exact opposite of fragile. Let us call it antifragile. Antifragility is beyond resilience or robustness. The resilient resists shocks and stays the same; the antifragile gets better.

Bitcoin is antifragile because it thrives off global monetary disorder within the dollar pyramid and is resilient to the threats, slander, and legislation from dismissive bureaucratic entities. The plain truth about Bitcoin is that nobody controls it. It has become the first-ever government-free, universally accessible digital currency. And for these reasons, all currencies in the purely digital realm will face price discovery in BTC terms. This means that all digital currencies, from cryptocurrencies to CBDCs, will be measured in BTC, just like the Bretton Woods agreement in 1944 mandated all currencies be measured in USD. Figure 18 elucidates a future in which BTC is the world reserve currency and only first-layer money.

Important Considerations When Creating Any Alternative Monetary System

For this, lets read from Thomas Greco's "[Money](#)":

Monetary theory speaks of several factors that contribute to a sound currency or credit system. The most essential of these factors can be highlighted in the following questions:

- 1. What should be the basis on which money is issued into circulation?*
- 2. What factors should determine the amount of money to be issued?*
- 3. Who should have the power to issue money?*
- 4. How should the power to issue be allocated among those empowered to issue, and what should be the limits on the amount issued?*

It is a fundamental principle of monetary theory that the quantity of the exchange medium being created and put into circulation should be balanced by the flow of goods and services coming into the market. In an

ideal system, the quantity of money in circulation should be self-adjusting.

Much is made of the “quantity (or volume) theory of the value of money,” and it is generally accepted as valid. But as shown in chapter 9, it is not the quantity of money per se that determines its value; so it is not the quantity that needs to be controlled. If money is properly issued, there will never be any problem of undersupply or oversupply. The quantity of money will always be just the right amount to purchase the goods and services that it represents. Capital goods, land, purchases by consumers, and ever expanding government debt should therefore all be excluded as allowable bases of issue. It is only the politicization of money and the monopolization of its issuance and control that have caused the focus of attention to be shifted away from its true value foundation onto its mere volume. The proper basis of issue is the transfer of value, as it is being exchanged, from a producer to another (potential) producer.

In a mutual credit system, credits are created as needed to mediate an exchange, and there is no interest burden placed on the associated debits. The total amount of credits is always balanced with an equal amount of total debits; so there can never be an artificial shortage or surplus, as there is in the official monetary system.

The third important factor is the power to issue. In conventional banking, it is the bankers who have the power to decide who should be allowed to create

money by being granted a “loan.” The bankers, thus, designate some people as being “creditworthy” and others not. Those who are granted “loans” are, of course, required to pay the bankers interest, even though the bankers have not loaned anything but merely allowed the borrower to monetize the value of his or her assets.

In a truly free society, power of all kinds, including economic and financial power, should be widely distributed. Our objectives in promoting community currencies and exchange systems are to make trading more facile and to democratize economics.

- Thomas Greco, [“Money”](#)

The Case for Demurrage (Negative Interest) Built into Some MoVs

As we previously saw, DeFi gives us very creative options. Taking advantage of this, we can have tokens optimized to be a great medium of exchange (MoE) by build demurrage (negative interest) into the token to discourage hoarding and encourage circulation. Whereas another token can be optimized as a store of value (SoV) for saving (hoarding). The problem with CeFi fiat currencies is that they try to bundle MoE UoA and SoV into a single currency, whereas it is often more practical and advantageous to split those functions into separate tokens. Tokens built to enhance trade, optimized as an MoE, possibly with built in demurrage so they lose value if held, so better to spend them. And different tokens built to enhance savings, optimized as SoVs that hold and increase in value over time.

The key feature of this design is that the money has a form of negative interest rate (called demurrage), which means that, like many aspects of nature, it decomposes, gently losing value over time. The theory is that there is an incentive to spend it quickly.

- Peter North, "[Local Money](#)"

*The idea known as "demurrage" was put forth by Silvio Gesell (*The Natural Economic Order*) almost a century ago. Demurrage is essentially a "tax" on the holding of currency out of circulation, intended to prevent the hoarding of currency and to keep it circulating at a rapid pace.*

The problem with money as we've known it, is not so much the slow velocity of its circulation, but the lack of adequate supply of money going to the productive sector. Getting an adequate supply of exchange media (credit) to the productive sector is the basic problem that needs to be addressed in solving "the money problem," and that is the main point in creating complementary currencies.³⁷

³⁷ <https://beyondmoney.net/monographs/demurrage-is-it-a-good-idea-for-a-local-currency-or-exchange-system/>

Similar to a negative interest on money, the demurrage feature functions like a parking fee, which is levied for holding onto the currency for too long without spending it. In technical terms, when demurrage is applied, money continues to function as a “medium of exchange” but no longer serves as a “store of value,” that is, something worth hoarding. Though saving was very much encouraged, it was not done by storing currency, but took the form of productive assets. Examples of such investments were land improvements or high-quality maintenance of equipment such as water wheels and windmills, or enduring investments in the community such as the cathedrals. The specifics of how demurrage was applied differed from region to region, but generally speaking, provided a built-in incentive to invest in this way.

Given that savings were inherently discouraged by demurrage, these currencies would remain in circulation and were exchanged with far greater frequency at all levels of society, in contrast to other forms of money. The greater velocity of circulation (a higher frequency of transactions with the same given coin) enabled the less privileged classes to engage in substantially more transactions, which significantly improved their standard of living.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

Like the German Wära, the Wörgl was a stamp scrip that included a “relief tax,” which was actually a demurrage charge applied through a stamp affixed each month at 1 percent of face value. As with other demurrage charges, this relief tax acted as an incentive to keep the currency in circulation. Those paid in Wörgl made sure to spend it quickly. The extra money in circulation led to additional employment opportunities in the community.

The Austrian Wörgl, like the German Wära, was a dramatic success. Wörgl quickly became the only town in Austria with full employment. This was made possible through the rapid circulation of the local stamp scrip, which was estimated to have created eight times more employment than national shillings would have. The demurrage-charged, anti-hoarding feature proved particularly effective as a spontaneous work-generating device.

It was at that point that the Austrian central bank reacted. Like its German counterpart, the central bank decided to assert its monopoly rights, making it a criminal offense to issue the currency. The complementary currency was banned and in a very short span of time following, the town of Wörgl returned to 30 percent unemployment. Predictably, as in neighboring Germany, Austria’s economy continued to decline. During the Anschluss of 1938—the occupation and annexation of Austria into Nazi Germany—many Austrians openly welcomed Adolph Hitler as their economic and political savior.

- Bernard Lietaer & Stephen Belgin , "[New Money for a New World](#)"

Connecting Local Money to National & International Fiat Currencies

I'm going to oversimplify yet again. If you are in a hurry, simply connect your solution to an existing exchange, such as:

- <https://cloud.binance.com/>
- <https://polymath.network/>
- <https://www.tzero.com/>
- <https://bosonic.digital/>

There are many other ways, if you use your imagination.

Ultimately, this is a very broad and complex subject, and beyond the scope of this book. For this, I recommend you read the book "[Layered Money](#)" by Nik Bhatia, and "[New Money for a New World](#)" by Bernard Lietaer and Stephen Belgin, plus relevant technical papers suited to your solution.

The Money Flower (Deutsche Bank and The BIS Accept That Alternative Currencies Are Here to Stay)

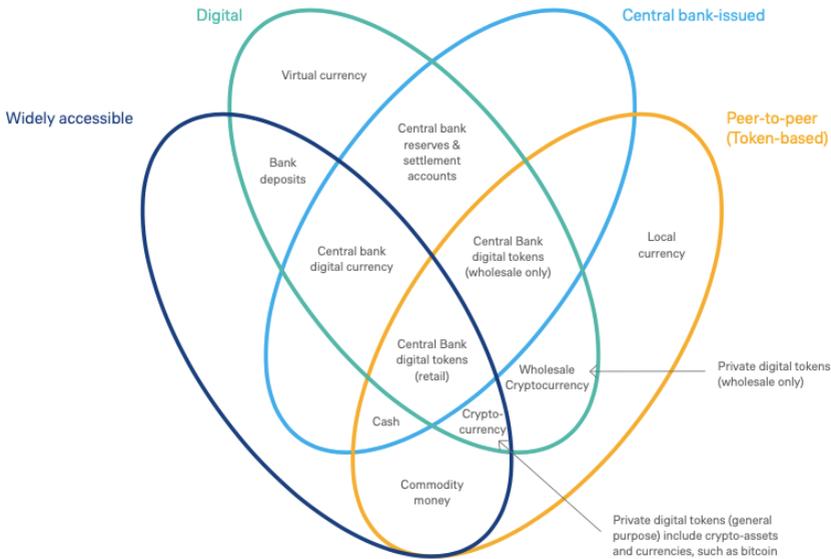
"Most people alive today grew up in a world in which each country had distinct symbols of sovereignty—one flag, one leader, and one currency. But by 2030 some of the most important currencies in

the world will be issued not by governments but by companies or even by computers."

- Mauro F. Guillen, "2030"

Deutsche Bank³⁸ and the Bank of International Settlements (BIS)³⁹ came up with this diagram, the Money Flower:

The money flower: a taxonomy of money



Source: Adaptation from Bank for International Settlements (2017) based on Bech and Garratt (2017). Notes: The Venn-diagram illustrates the four key properties of money: issuer (central bank or not); form (digital or physical); accessibility (widely or restricted); and technology (account-based or token-based). Bank deposits are not widely accessible in all jurisdictions.

³⁸ https://www.dbresearch.com/PROD/RPS_EN-PROD/The_Future_of_Payments_-_Part_III_Digital_Currenc/RPS_EN_DOC_VIEW.calias?rwnode=PROD000000000500284&ProdCollection=PROD000000000504589#

³⁹ https://www.bis.org/publ/qtrpdf/r_qt1709z.htm

Basically, what they are saying is that they understand that complimentary currencies are here to stay. They will form part of the new ecosystem of money and currencies.

Furthermore, many other banks also recognize the power of DeFi. Which is very encouraging.

Citibank's Global Perspective and Solutions (Citi GPS) report entitled "Future of Money: Crypto, CBDCs and 21st Century Cash," the 209-year-old lender espoused the benefits of DeFi, including the removal of third-party intermediaries and increased financial transparency. Notably, the same report also explored various DeFi protocols such as Maker, Compound, Uniswap, and UMA. An in-depth report by the Federal Reserve Bank of St Louis also highlights DeFi's potential to cause a "paradigm shift in the financial industry and potentially contribute toward a more robust, open, and transparent financial infrastructure.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

It is definitely shaping up to be the most important new economic and monetary innovation in a very, very long time.

You will be able to trade in any medium you wish in the cybereconomy. The late Nobel Prize-winning economist E A. Hayek argued, there is "no clear distinction between money and non-money." He wrote, " although we usually assume there is a sharp line of

distinction between what is money and what is not-and the law generally tries to make such a distinction-so far as the causal effects of monetary events are concerned, there is no such clear difference. What we find is rather a continuum in which objects of various degrees of liquidity, or with values which can fluctuate independently of each other, shade into each other in the degree to which they function as money." The cybereconomy of the Information Age will be more free than any other commercial realm in history. It is therefore reasonable to expect that the cybereconomy will rapidly become the most important new economy of the new millennium. Its success will attract new participants from everywhere on the globe, in the same way that the wide use of fax machines made telecopying increasingly attractive for nonusers.

*- James Dale Davidson, Lord William Rees-Mogg ,
["The Sovereign Individual"](#)*

Taxation of DeFi Currencies (And Helping Government Become Good Governance)

Let's call a spade a spade. We need governance. Governance is an essential component of civilization. Obviously, bad governance exists, just as good governance exists. What we need is good governance, not bad governance. Bad governance can go to hell. Good governance is something we must all work to maintain and make even better.

Government is one of the institutions of governance. We must do everything in our power to ensure we have a functional, sustainable, adaptable, and benevolent *good* government. We must support such good government, for our own good.

Now, government, by definition, doesn't generate revenue by producing goods and services. That is not its function, nor should it be.

Yet, it needs revenue to finance operations.

This revenue has traditionally come from taxes.

So, what happens when cybermoney makes it increasingly difficult for a good government to collect enough tax revenue to finance its operations that are for our own good?

And what happens when there is no distinct legal territory in which many future financial transactions will occur? When they occur in cyberspace instead of on the ground in country X or country Y?

Cyberspace has no political or jurisdictional boundaries.

When the state finds itself unable to meet its committed expenditure by raising tax revenues, it will resort to other, more desperate measures. Among them is printing money. Governments have grown used to enjoying a monopoly over currency that they could depreciate at will. This arbitrary inflation has been a prominent feature of the monetary policy of all twentieth century states. Even the best national currency of the postwar period, the German mark, lost 71 percent of its value from January 1, 1949, through the end of June 1995. In the same period, the U.S dollar lost 84 percent of its value. This inflation had the same effect as a tax on all who hold the currency. As we explore later, inflation as revenue option will be largely foreclosed by the emergence of cybermoney.

New technologies will allow the holders of wealth to bypass the national monopolies that have issued and regulated money in the modern period. The state will continue to control the industrial-era printing presses,

but their importance for controlling the world's wealth will be transcended by mathematical algorithms that have no physical existence. In the new millennium, cybermoney controlled by private markets will supersede fiat money issued by governments. For inescapable reasons that we explore at length in this book, information technology will, destroy the capacity of the state to charge more for its services than they are worth to the people who pay for them.

*- James Dale Davidson, Lord William Rees-Mogg ,
["The Sovereign Individual"](#)*

Widespread adoption of public-key/private-key encryption technologies will soon allow many economic activities to be completed anywhere you please. As James Bennet, technology editor of Strategic Investment, has written: Enforcement of laws and particularly tax codes has become heavily dependent on surveillance of communications and transactions. Once the next logical steps have been taken, and offshore banking locations offer the services of communication in hard RSA-encrypted electronic mail using account numbers derived from public-key systems, financial transactions will be almost impossible to monitor at the bank or in communications. Even if the tax authorities were to plant a mole in the offshore bank, or burglarize the

bank records, they would not be able to identify depositors.'

To a degree that has never before been possible, individuals will be able to determine where to domicile their economic activities and how much income tax they prefer to pay. Many transactions in the Information Age will not need to be domiciled in any territorial sovereignty at all.

*- James Dale Davidson, Lord William Rees-Mogg ,
["The Sovereign Individual"](#)*

The new technology of the Information Age will effectively protect cyberassets at a vanishingly small cost. For \$55 rather than \$55 million, participants in the cybereconomy will enjoy better actual protection of their assets than they enjoyed during the industrial era or at any previous time in history.

Easily used encryption algorithms and the capacity to shop between terrestrial domiciles for transactions will provide effective protection against the largest source of predation, nation-states themselves.

That is not to say that territorial governments will be entirely outmaneuvered.

They will still be able to exploit vulnerabilities to personal harm in order to extract head taxes, or perhaps even hold wealthy individuals to outright ransom. They will also be able to enforce collection of consumption taxes. Yet protection, the most important service governments provide, will be put on a more nearly competitive basis. Less of the cost that productive people pay for protection will be available to be seized and reallocated by political authorities.

*- James Dale Davidson, Lord William Rees-Mogg ,
["The Sovereign Individual"](#)*

We argue in this book that it will no longer take a nation-state to fight an Information War. Such wars could be undertaken by computer programmers deploying large numbers of "bots" or digital servants. Bill Gates already possesses a greater capacity to detonate logic bombs in vulnerable systems globally than most of the world's nation-states. In the age of the Information War, any software company, or even the Church of Scientology, would be a more formidable antagonist than the accumulated threat posed by the majority of the states with seats in the United Nations.

This loss of power by nation-states is a logical consequence of the advent of low-cost, advanced computational capacity. Micro-processing both reduces returns to violence and creates for the first time a competitive market for the protection services for

which governments charged monopoly prices in the industrial period.

*- James Dale Davidson, Lord William Rees-Mogg ,
["The Sovereign Individual"](#)*

There is no clear answer I can see.

All I can see is that the governments cannot get rid of Bitcoin and DeFi. And they cannot completely regulate it any more than they can regulate the air we breathe, which is bound by no national jurisdiction and cannot be "held" by regulations. Strong-arm tactics won't work long-term with this one. It is impossible.

Yet, we need governance and government (good government, that is).

So, I suggest working together to find solutions as we ride on into this new future.

Not government vs DeFi, but government in cooperation *with* DeFi.

Because ultimately, DeFi needs peaceful environments that are well governed, for its benefits to be fully realized. And government needs tax revenues, which it can no longer get by pure force and coercion under the elusive nature of DeFi.

I'd also suggest that, eventually, maybe a few years from now, governments will be forced by circumstances to accept taxes in a variety of currencies. Today, each government in the world insists that everyone pay taxes using the national currency. This insistence is one reason why the national currency stays relevant and in demand, because it is the only way to pay currency. Taxation, in other words, gives added value and utility to legal tender.

However, once people get options as DeFi promises, government may have no choice but to accept taxes in a variety of currencies, in addition to the national fiat currency. This is also good for DeFi because, just as it does with legal tender, this action will add more value and utility to it, even as it opens the doors for government to raise revenue for good operations.

If You Can't Beat Them, Join Them (Central Banks and Multinationals Are Starting Their Own Cryptocurrencies)

The invention of bitcoin has changed money forever. Central banks realize this. One of their responses has been to create their own cryptocurrencies, called Central Bank Digital Currencies (CBDCs). None have launched yet, but many are in development.

So far, here is the growing list of countries that have announced CBDC development. An eye-popping 83 countries representing over 90% of global GDP, as of this writing (see <https://www.atlanticcouncil.org/cbdctracker/> and <https://cbdctracker.org/>).

No one knows how they will work. Most are still in research.

Some might be government owned, and some might be owned by the same privately-owned banking system we have today.

Personally, I don't mind that the CBDCs are coming, and I think it is healthy to have alternatives, but I would hate to have them as the sole currency available. Because, ultimately, they will be under the full control and surveillance of governments and the privately-owned banking system, even more so than with old fiat currencies, with the ability to turn them off at will for people or groups that disagree with the political views of the day, the ability to track people at will and erode privacy even further, and so on. It is far too tempting a lever to place in the hands of political power. As the sole currencies available, they would increase the already disturbing levels of Surveillance Capitalism and tendencies towards fascism that we are experiencing today.

Remember, the real beauty of Bitcoin, for example, is not that it is digital. It is that Bitcoin takes the politicians, presidents, revolutionary leaders, military dictators, and TV pundits out of monetary policy altogether. It provides alternatives.

Plus, besides being more efficient, CBDCs wouldn't really solve the problems we have discussed in this book.

So, it's fine to have CBDCs, but it's also good to have something else besides CBDCs. At the very least, that will keep governments honest.

This [speech by Andreas Antonopoulos, given in Berlin in 2019](#), is relevant here:

Without the freedom to transact, without the freedom to associate, your freedom of expression and your freedom to vote means absolutely nothing. If we go to a world where [government issued] digital cash is the only cash that exists, if we eradicate cash as so many governments trying to do, if we eradicate the ability to transact anonymously, individual to individual, every government that controls that system can turn off your economic life by flipping one bit. You went to the wrong protest, you voted for the wrong party, you talk to the wrong person on the internet, you no longer exists. You have no income, you can't buy food, you can't travel on the trains, you can't take a plane. You think I'm exaggerating. This system exists today. It's called Sesame Credit. It's being trialed in China, it has excluded 100 million people from using public transportation and flying across the country. It denies people access to fundamental services, by virtue of how politically they engage with others. Every country in the world that gives this ability to a government is one bad election from losing their freedom forever. We have a choice. We are at a crossroads. And in this crossroads, we have to pick between a future where trust is a decentralized open protocol that everybody participates in. Or a future where trust is controlled by narrow centralized interests that use that to control our lives. And to prevent us from engaging with each other. That creates tears, not

just between citizen versus non citizen, but of human versus subhuman. Where people are judged by their credit score, as unworthy to participate in the global economy, by their lack of identity as unworthy to participate in commerce.

And you know what? Open public blockchains like Bitcoin say? Everyone is worthy. You don't even need to be human to participate. Software agents can do it for you. There is no requirement for ID, there's no requirements to even prove you have a heartbeat. We have now for the first time in history, the ability to scale trust and security to a global level based on an open protocol that no one can corrupt, coopt, takeover and control. And with that model, we can seek freedom. We can build tremendous applications, software that is unstoppable, speech that is uncensorable, commerce that is not able to be de-platformed or silenced. We will take back the internet from the companies that can decide that hate speech is okay, but female nipples are terrifying to our children. You know what's terrifying to our children? Fascism is terrifying to our children, not nipples. They have a more intimate and natural relationship with nipples. For the first three years of their life, at least. We should be terrified about the future of our children, but not because they're going to be exposed to nudity, but they are going to be exposed to radicalism. And those same companies that adopt their puritanical morality that you didn't vote for, and doesn't match your interests, don't give a shit about the environment. They don't give a shit about environmentalism. They don't give a shit about LGBTQ issues. What they do, they put a giant sign with a rainbow that says MasterCard on it. Are you fucking

kidding me? Those companies are selling us a fake morality that has been focus grouped and delivered to us packaged in a dopamine engaging algorithm that will tweak our brain until we are mindless drones. We will take back the internet. We will take back our data, we will take back our privacy, which is a fundamental human right. And we will do all of that by building absolutely unstoppable platforms and protocols for the next frontier in trust and security. Thank you.

- Andreas Antonopoulos,
<https://www.youtube.com/watch?v=hj-RRAYLoaM>

And then there is Facebook consortium's [Libra \(aka Diem\)](#)⁴⁰.

Decentralization of Finance Also Builds Resilience, Variety and Self-Determination

In our imaginary local economy of the future, more of the food a community needs is grown locally and sold in locally owned shops, cooperatives and markets. More of its electricity is generated locally, and delivered by community-owned local power companies. Seeing the benefits in cash, and feeling a sense of local ownership, short-sighted people who would have protested against windmills as a noisy blot on an otherwise pristine natural landscape now see them as

⁴⁰ <https://www.diem.com/en-us/>

'angels on the hills', as beautiful as the sixteenth-century windmills protected for their heritage value, or a dry-stone wall.

More and more people work for themselves, part-time, for a mixture of local and national currencies. They do not see their livelihood coming from a nine-to-five job, but from a mixture of things they grow and produce themselves, things they exchange, share, recycle and repair, and things they buy and consume much as we do today. But far more of the things we need are produced locally than they are today. Those that we can't produce locally, perhaps because of local climatic conditions or because it makes sense to produce them in bulk, are still exchanged globally, but not on the basis of price alone. We choose what businesses we want to see in our community, and whom we exchange with.

- Local communities have visions, skills and enthusiasms, but they do not have the sterling, Euros or dollars necessary to build a resilient local economy themselves.*

- We can create money that values everyone's time equally.*

- We can create currencies that build community feeling, not cut us off from each other in a competition over limited resources.*

- *We can create money that doesn't travel too far away, so it circulates around our community. It helps local businesses, and stimulates local production.*

Local economies should be diverse. People should make their livings in many different ways, not all work in one sector or firm. Economic monocultures are not resilient. In a company town everyone works for the same employer, which is boring but at least people have jobs. But what if that firm goes under? We saw the devastation that was visited in one industry towns such as Britain's mining villages when the one source of employment goes. They are not resilient.

If people are employed by a range of businesses, employ themselves, work part-time, and produce more of the things they need themselves, the local economy is more likely to be resilient in the face of changes in demand or external shocks. If one part of the economy goes into decline or breaks down there are plenty of alternatives to take its place.

- Peter North, "[Local Money](#)"

Providing a new basis to increase the flow of assets throughout the local economic system in ways that meet real needs (while enhancing generative capacities) strengthens the foundation, the reproductive system, the greenhouse of the economy

called capital. In this way, community and complementary currencies create new capital by fostering other forms of capital in the economy. A currency that encourages people to save energy, reduce fossil fuel use and lower emissions strengthens the natural capital of the climate regulation system and creates new capital for innovation in the energy sector. Using a local currency to link vocational trainees with houses that need renovation creates new capital in both the built environment and the human capital sectors. New capital can be created in most areas if we find new ways to unleash our creativity, interdependence and compassion outside and around the constraints national money imposes. Abundance and sufficiency are available to us, even in a finite world.

- Gwendolyn Hallsmith, Bernard Lietaer, "[Creating Wealth](#)"

We can, then, create money as long as it doesn't attempt to look like national currency banknotes. If it does, it's forgery.

If we can create money, it follows that there is no longer any need to say 'we can't afford to – we don't have the money' when faced with problems – such as addressing climate change and resource depletion. What matters is not if we can afford to or not, but if we have the time, resources and knowledge to solve our

problems and then the willingness and ability to commit this time, resources and knowledge to the task. It's crazy that we have unemployed builders and inefficient homes leaking heat and burning oil to keep us warm or cool, but the Government says we can't afford to fix the problem because 'we don't have the money'. Money should lubricate, not govern this process.

We know that climate change and resource crises are clear, urgent, present fundamental challenges to the survival of the human race and to biodiversity generally. To meet these challenges we need to focus on the skills, enthusiasm and resources we have in our communities and use money to utilise these to the full. If the banks are so big, so central, that they cannot be allowed to fail and money is created to pay for corporate welfare, then we can also say that the ecosystems we and other species depend upon are too important to be allowed to fail.

This puts money in its real place – as a store of value and unit of measurement. Saying 'there isn't enough money' is like saying 'there aren't enough inches'. Inches are a way of measuring – there isn't a limited supply of inches somewhere, and it would be nonsensical to say 'someone else has all the inches; there aren't any left over for me'. Money is just a way of measuring the value we have created, and saving that value so we can use it later, with someone else. While it would not make sense to produce hundreds of abstract 'inches' disconnected from something to measure, neither does it make sense to say 'there isn't

enough money' when we know money is just a way to measure and store value. What matters is the work we need to do and the time we have, not the existence or non-existence of money.

Complementary currencies, created by communities, businesses and voluntary organisations, can do things that national currencies can't. They won't ever replace pounds and pence, dollars or Euros and cents, but they can help build resilient and inclusive local communities and economies in ways that relying on national currencies will never do.

- Peter North, "[Local Money](#)"

The Massive Hidden Potential of The Blockchain & DeFi

The Economy Works Best When It Works for All (Universal Access to Basic Finance)

The economy works best when it works for all.

Most of us understand this nationally.

But we fail to understand it internationally.

In your country, if you have many unemployed or disadvantaged people, you know very well that it is not good for your country. Crime rates go up, social problems go up, insecurity rises, and bad things happen. You know very well that in your country, if everyone had a descent standard of living and descent work and play, it is good for everyone! A prosperous, safe, nation.

Now, we often fail to use that same logic globally. Instead of wishing that everyone in the world has prosperity, we compete and cannibalize each other in the name of nationalism and patriotism. We fail to realize that if everyone on our planet had a descent standard of living and descent work and play, it is good for everyone! A prosperous, safe world.

It is to your benefit and best interests to have peace on earth for all, prosperity for all.

A rising tide floats all boats.

Collaboration is better than competition.

We can compete in sports for fun but competing economically ruins us.

We must stop falling for the divide-and-conquer trick.

Let's try collaboration. Working together is the only way we will solve our personal and global problems.

The economy works best when it works for all.

Digital financial services and markets that work for all, that is the hidden power and potential of DeFi. DeFi can be used to build all the “normal” and alternative/complementary currencies and financial products and services we have discussed. And more.

For everyone in the world.

Not just for a "lucky few". Not just for “my country”.

For everyone in the world.

In order to achieve prosperity, an individual must possess, at minimum, access to some form of basic financial services to reliably store and move value, communication, and transactional tools to connect to the global economy, and security, protection, and enforcement of the title to land and other assets they possess legally. This and more is the promise of the blockchain. The stories you will read should give you a sense of a future where there is prosperity for everyone, not just more wealth and power for the wealthy and powerful. Perhaps even a world where we own our data and can protect our privacy and personal security. An

open world where everyone can contribute to our technology infrastructure, rather than a world of walled gardens where big companies offer proprietary apps. A world where billions of excluded people can now participate in the global economy and share in its largesse.

- Don Tapscott, Alex Tapscott, "[Blockchain Revolution](#)"

Due to the public nature of distributed ledgers, DeFi applications are designed to be globally accessible by anyone around the world with an Internet connection

- Shermin Voshmgir, "[Token Economy](#)"

*The money question here is: **How will we address economic inequality globally when even industrialized nations are finding it increasingly difficult to provide for their own citizens?** We need to better understand money —our hammer—and how it is interwoven into every element of our society. Our Age of Anxiety is, in great part, the result of trying to do today's jobs with yesterday's tools. The modern crises are, man-made and differ from many of their predecessors in that they can be dealt with. To better appreciate our agreements*

about money, it is first necessary to understand the banking system, not because that is where money is kept, but rather because it is where money is created. The current agreements we have regarding our monetary and banking systems were made in late 16th-century England. The banks were given the right to create new money from the deposits they received, which is commonly known as the fractional reserve system. In this money-creation process, almost all of our money is debt money, derived from loans made by our banking system. All conventional national currencies in the world today are fiat currencies. They are created by an authority that declares a particular medium of exchange as acceptable in payment of taxes—that is, as valid legal tender.

- Bernard Lietaer & Stephen Belgin , “[New Money for a New World](#)”

Future Outlook: A Whole New World, In A New Energy (Re-inventing Society, Business, Government, Technology & Education)

2020-2030 Forecast (DeFi and Beyond)

“History is a race between education and catastrophe”

- H.G. Wells

When change occurs in technology or the other factors that set the boundaries where violence is exercised, the character of society inevitably changes with them.

- James Dale Davidson, Lord William Rees-Mogg,
“Sovereign Individual”

We have entered a decade of rapid change, massive, dizzying change. We are about to see a technological revolution like none other we've seen.

Beyond DeFi.

Yet, DeFi will serve many of those changes in unforeseen ways.

Let's look at what might be in store...

The Materials Revolution: The way we understand materials, the building blocks of our physical world, whether it's construction materials or clothing, or whatever, is changing radically. For example:

- **Biomaterials.** These are biological or synthetic substances, which can be introduced into body tissue as part of an implanted medical device or otherwise, maybe to replace an organ or to replace a body function or to enhance a body function. The idea of a superwoman or superman is already happening.
- **Graphene** has emerged as one of the most promising nanomaterials because of its unique combination of super properties. It is also one of the thinnest yet strongest materials ever, and it conducts heat and electricity better than most other materials. It is optically transparent, yet extremely dense. Useful in a wide variety of ways. Another example is flexible solar cells. Tiny little flexible ones that can be placed on all sorts of surfaces. That's already here.
- **Hemp.** Hemp was the world's first billion-dollar crop in the 1930s, before it was banned due to shadowy political interests in the then-new industry of plastics. If hemp remained legal, plastics would not have taken off as they have. That's why it was banned. The ban had nothing to do with getting high. That was just a scapegoat, a ruse designed in the 1930s seemingly by Andrew Mellon, Harry J. Anslinger, Randolph Hearst, the Du Ponts, and their friends, to protect their budding multi-billion-dollar plastics future, by filling the public with fears around "getting high, reefer madness". They banned hemp by pretending it makes people high and dangerous. It doesn't. And they knew that. They did it to protect their new industry. Because you see, hemp grows cheaply, worldwide, and it can make over 50,000 categories of products. Extremely versatile, and biodegradable. And strong. Historically, hemp was the, the

primary ingredient used for all sorts of materials, fibers, medicines, ship building, textiles, containers, and much more. In fact, ironically, the United States Constitution is written on hemp paper. It's an incredible thing. You can even make airplanes out of hemp, the entire plane can be made out of hemp except the engine block and the glass on the windshield. Popular Mechanics magazine, in their February 1938 issue, said that "Hemp is the standard fiber of the world. It has great tensile strength and durability. It is used to produce more than 5,000 textile products, ranging from rope to fine laces, and the woody "hurds" remaining after the fiber has been removed contain more than seventy-seven per cent cellulose, and can be used to produce more than 25,000 products, ranging from dynamite to cellophane." It's an amazing material and it is coming back as the bans are lifted.

- **Meta-materials.** Meta-materials are materials that have been engineered to have a property that are not found in naturally occurring materials. Engineered composites. Designed around unique micro- and nanoscale patterns or structures, which cause them to interact with light and other forms of energy in ways not found in nature. This gives them incredible properties and capabilities, such as invisibility cloaking, and all sorts of sci-fi like abilities. That's already here.
- **Nanomaterials.** Extremely small, with a wide variety of novel uses.
- **Rechargeable metal air batteries.** These are light, they're compact, and they have grid scale energy storage. Grid scale, so not like mobile phones scale, not like Tesla car scale, but grid scale storage capacity.
- **Recyclable carbon fiber composites.**
- **Ultra-thin, ultra-flexible, ultra-light silicon circuits.** Capable of providing very high physical and computational performance on tiny, curved surfaces.

The Energy Revolution: We are going to abandon fossil fuels. Oil and gas are dinosaurs. In the fact, fossil fuel technology could have been wiped out 50 years ago, if it wasn't for resistance and sabotage from the incumbent energy owners. Fossil fuels are Centralized Energy. Someone owns an oil well, and we all have to go to them for oil, and that gives them monopoly power and wealth. A strong incentive to ensure that Decentralized Energy doesn't get developed. Yet, there are so many replacements, mostly decentralized. We are soon going to be forced by nature to develop renewable energy. But beyond renewable energy, there will be massive advances in alternative Decentralized Energy. Think, how does a UFO fly around the galaxy without oil? We have that technology already, suppressed by certain military stealth programs. And did you know that the [Federation of American Scientists lists almost 6,000 patents that have been subject to a "secrecy order"](#)⁴¹ under the Invention Secrecy Act of 1951? [Secrecy orders allow U.S. defense agencies to control patents, including those that are privately developed.](#)⁴² Some of these patents may be for energy devices the military doesn't wish the world to know about. Devices capable of extracting energy from the environment, as Nicholas Tesla showed was possible. The environment around us contains more than enough energy to power the planet many times over. We are, we have so much clean energy around us, waiting for the right technology to tap into it.

3D Printing and Manufacturing: Making three dimensional solid objects from a digital file. You can make anything. Very exciting stuff. And it's going to grow because people are starting to realize we cannot just keep importing everything from China. I'm not trying to knock China, but it's just basics. First, that is a risky supply chain to just depend on one country for everything. Secondly, it's bad for the environment to keep shipping things across the oceans. Hence the idea of every home having a little device that can print a whole wide range of things is appealing. All

⁴¹ <https://fas.org/blogs/secrecy/2018/10/invention-secrecy-2018/>

⁴² <https://slate.com/technology/2018/05/the-thousands-of-secret-patents-that-the-u-s-government-refuses-to-make-public.html>

you need to do is download the plan, and the 3D printer prints the product.

AI: Artificial Intelligence is also going to accelerate our innovation in ways that humans cannot think of. AI doesn't think like a human. If you asked AI to design a car, it would look radically different from a human designed car - and it would work.

Blockchain: The blockchain is a game changer on so many levels, even beyond DeFi. It has the potential to revolutionize governance, politics, finance, and many other domains.

Cognitive Systems: Computing systems that learn and can scale their learning. They can learn by themselves and grow, they can reason with a purpose, and they can interact with human beings naturally. A system that can learn and reason from its interaction with human beings, and from its experiences with its environment. This is different from AI. AI figures out how to solve very complex problems. A cognitive system on the other hand focuses on mimicking human behavior and reasoning.

Internet of Things: IoT is a very huge area. IoT is simply a network of internet connected devices, some extremely tiny, and some very large. Most of them being sensors. Sensors everywhere. They all share data, all these different devices that have been planted on animals and people and things and so on. They all share data, and they interact with each other without requiring human intervention. Think of IoT as a huge, massive railroad connecting everything.

Democracy 2.0: Powered by new technologies such as the Internet, smart phones, and the blockchain, Democracy 2.0 is the inevitable movement that will put control of society in the hands of itself. It's not exactly a new system of government. It's a mechanism to decentralize leadership (not government itself) in our current system, both legally and peacefully. It can however be used to change government to however the people being governed want. We all realize that the current system is broken. Democracy 2.0 is the first practical (non-violent, legal, effective,

fair) way to begin gradually improving it from the ground-up, as opposed to tearing down the existing system and putting a completely new system in its place. Instead of politicians telling us what we should want or not want, we say what we want or don't want, using a highly transparent, fast, easy system accessible to every person on their phone. Instead of complaining about problems, we take action to solve them. It puts power back in the hands of the people and removes inefficiencies and influence by hidden special interests.

Next Generation Education: Our current education system was designed for the industrial era. It was started in 1819 in Prussia (now Germany), initially with the goal of producing dutiful children who would follow orders and become winning soldiers. Later extended to prepare them for factories. The whole world copied this model. It is extremely confining and limiting, and almost useless for the future of the planet.

And of course, the environment is doing its own radical thing.

Plus... nanotechnology, robotics, and so on. That is all already here. But perhaps one of the most exciting is Democracy 2.0 and Next Generation Education.

Awakening: Our spirituality is expanding, and people are “waking up”.

And there is the potential of full, on-the-ground **extra-terrestrial disclosure** before 2030.

So, a lot of changes coming our way in the next decade.

And some, if not a lot of it, will be financed and run using DeFi.

For example, DeFi could be used to raise capital for some of these projects using DAOs, ICOs and similar instruments.

It could also be used to power the smart micro-payments needed by IoT devices, like <https://www.iota.org/> is attempting to do.

And remember, when the type of money changes, the society changes:

We need to realize that money has a big impact on the type of society, economy, and environment we live in.

This means that changing the form of money we use will lead to changes the type of society, economy, and environment we live in.

Society will, only a few generations from now, be as different from modern industrial society as that is from a society in the Middle Ages.

- Willis Harman

We see the transition to digital payments as having the potential to do no less than rebalance global economic power.

- Jim Reid , Jim Reid , Marion Laboure , Marion Laboure, "[The Future of Payments \(Deutsche Bank Corporate Bank Research January 2020\)](#)"⁴³

⁴³ https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD00000000504353/The_Future_of_Payments_-_Part_I__Cash%3A_the_Dinosau.pdf?undefined&reaload=45h5IYn34frwYahk/AEUxBnmymr89XSjAYoEkf/qZFeCuR2~Gusg/H21~nqi8EZ

Blockchain technologies can change what it means to be a citizen and participate in the political process, from voting and accessing social services to solving some of society's big hairy problems and holding elected representatives accountable for the promises that got them elected. Safety measures are embedded in the network with no single point of failure, and they provide not only confidentiality, but also authenticity and nonrepudiation to all activity. Anyone who wants to participate must use cryptography - opting out is not an option - and the consequences of reckless behavior are isolated to the person who behaved recklessly.

- Don Tapscott and Alex Tapscott, "[Blockchain Revolution](#)"

Money is deemed value neutral; therefore, it is thought to have no effect on one's conduct. What happened with the !Kung tribe over half a century ago, however, clearly illustrates just the opposite: It is the type of money used in a transaction that encourages competition or collaboration, stinginess or generosity.

The !Kung are considered one of the very last societies on Earth whose ways of living have remained fundamentally unchanged since prehistoric times. They live in the high plateau of the Kalahari Desert, an area that occupies most of the country of Botswana and parts of Namibia and South Africa. This Iron Age clan

remained largely isolated for over 40,000 years. Whatever outside contact they had did not alter the !Kung way of life. This was proven in archaeological digs,¹¹ which found a range of stone and bone tools and a specific camp lay- out, excavated from three ancient !Kung sites.

In the 1960s and 1970s, anthropologist John Yellen studied the !Kung lifestyle. This time period happened to be just before and after these people became acquainted with conventional money, which brought about unprecedented change in the !Kung culture in a remarkably short period of time.¹²

Traditionally, the !Kung adhered to a rich set of social values and rules, which regulated the distribution of food and other goods. The practice of sharing formed the core of the !Kung system of values.

Families were expected to welcome relatives who showed up at their camps. Moreover, etiquette dictated that meat from large kills be shared outside the immediate family. By distributing his bounty, a hunter ensured that the recipients of his largess would be obliged to return the favor sometime in the future. In the traditional !Kung view of the world, security was obtained by giving rather than hoarding, that is, by accumulating obligations that could be called upon in times of need.

The layout of a traditional !Kung camp reflected their norms of sharing and reciprocity. Huts were arranged in a circle, with the door- ways facing inward,

allowing members to directly look into each other's huts. The hearths were placed outside the huts, and each person could see what food everyone else was preparing and, therefore, whether there was any food to share. Individuals also established formal relationships with non-relatives in which two people gave each other gifts, such as knives or iron spears, at irregular intervals. Reciprocity was delayed, so that one person would always be in debt to the other.

During the 1970s, the Botswana government started to stimulate trade with the !Kung people. This development, as well as more contact with South Africa, introduced conventional money into the !Kung tribe. With this newfound cash, the !Kung people purchased such goods as glass beads, clothing, and extra blankets, which they hoarded in metal trunks, locked for the first time, inside their huts.

Many times, the items procured far exceeded the needs of an individual family and could best be viewed as a form of savings. As the !Kung hoarded, they stopped depending on others to give them gifts and retreated from their traditional interdependence. At the same time, perhaps because they were ashamed of not sharing, they sought privacy. The layout of the camps suddenly changed significantly, after having remained unchanged for 40,000 years! Hut openings no longer faced inward, distances between the huts increased, and hearths were moved inside. Privacy played a much greater role than before, and reciprocal exchanges lost their importance.

This example confirms that conventional money doesn't simply facilitate exchanges, as generally assumed, but rather actually creates very specific social behaviors. The !Kung, who had a culture of unusual generosity and consideration for the well-being of the group, a culture that had survived practically unchanged for millennia, was altered dramatically in less than one generation with the introduction of money. The tribe's emotional signature devolved into selfishness and parsimony, characteristics far more prevalent in the modern developed world than in their own traditions.

International financier George Soros concluded, "International trade and global financial markets are very good at generating wealth, but they cannot take care of other social needs, such as the preservation of peace, alleviation of poverty, protection of the environment, labor conditions, or human rights—what are generally called 'public goods.' "

- Bernard Lietaer, Jacqui Dunne, "[Rethinking Money](#)"

Reinventing legacy finance is about more than just the tech. It also means reinventing the culture. At its heart, DeFi represents a transparent and open-source movement with an extremely powerful culture that continues its mission to create tens of trillions of dollars in value. This culture is what helps to shape and legitimize DeFi. Great minds have come together and

attempted to solve some of the most pressing issues that plague traditional finance. The result combines traditional finance principles, innovation, and blockchain technology while offering superior financial products and services.

Where Does This Take Us in the Next 5 to 10 Years? It is difficult to say how things will be in the future, but we would like to think of DeFi as a technological movement that challenges the status quo of traditional finance. Similar to how the Internet has made many inventions obsolete by revolutionizing the way we communicate and share information, DeFi will do the same for finance and take advantage of a global network to create a more transparent and efficient financial system.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

The End of The US Dollar as The Sole Global Reserve Currency

And very soon. Probably within a few years.

To some people, this sounds ridiculous. Yet, a lot of reputable economists, world leaders, and billionaires hold this view. See:

- [The Changing World Order](#)⁴⁴, a set of articles by Ray Dalio (net worth \$20 billion)
- [Billionaire US fund manager Stanley Druckenmiller delivered an apocalyptic warning earlier this month that the dollar could cease to be the predominant global reserve currency within 15 years](#)⁴⁵.
- [US dollar loses shine as reserve currency for emerging economies](#)⁴⁶
- And many more. Just Google it (also search on [DuckDuckGo.com](#) for unfiltered results).

The history of money shows that fiat currencies around the world have had an average lifespan of 30 years. Because of loss of purchasing power. Their value goes towards zero over time due to over-printing and the debt component.

Global reserve currencies have a lifespan of about 80 years. We are already at the end of the cycle for the current global reserve currency, the US dollar.

When (not if) this happens, because all the world's monetary systems are linked to the US dollar, they will also suffer systemic aftershocks.

Thus, it makes sense to have complimentary currencies in place to cushion the shocks, rather than be caught with our pants down and at the mercy of fate and survival-based reactions.

The dollar's use as a global reserve currency gives the United States a particular advantage as the only country today that can afford a permanent deficit in its trade. This is because central banks are obliged to

⁴⁴ <https://www.linkedin.com/pulse/changing-world-order-ray-dalio-1f/>

⁴⁵ <https://www.ft.com/content/408d4065-f66d-4368-9095-c6a8743b0d01>

⁴⁶ <https://asia.nikkei.com/Business/Markets/Currencies/US-dollar-loses-shine-as-reserve-currency-for-emerging-economies>

accept dollars under the current rules of the IMF. Such an advantage, however, should not be considered a permanent status. This same torch was passed from Britain to America after World War II. Some people claim that it may well soon pass, in turn, to China.

Such transitions often incur friction, and fights for monetary zones of influence usually provoke damage. The most dangerous period occurs during the decline of a hegemonic power whereby the old guard no longer commands enough power to impose its own solution, but still retains sufficient influence to block any solution proposed by others. This is the situation we find ourselves in today. If a dollar crisis should erupt, the most likely outcome will be a fragmentation of the global system into three monetary zones: a dollar-dominated zone in the Western hemisphere, a european-dominated zone, and an Asian zone (still under preparation). We might expect high volatility between these monetary zones, even more than what is presently taking place with national currencies. It is also likely that foreign exchange controls will materialize between these zones, which will be costly and otherwise problematic. None of this is advantageous or conducive to peaceful economic and political evolution.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

"More than half of all international debt, loans, and foreign exchange reserves are held in dollars, and about 45 percent of foreign exchange turnover and global payments use the dollar. When it comes to trade, more than 80 percent is invoiced in dollars. The supremacy of the greenback in international finance and trade, however, will be called into question as we approach 2030."

- Mauro F. Guillen, "[2030](#)"

The Quadrillion Dollar Opportunity? How Much of The World's Wealth Will Transfer to The Blockchain and Decentralized Finance Over Time?

The blockchain is designed to handle not just currencies, but all sorts of assets. And do it arguable better, faster, cheaper. Especially once the technology matures over the next few years.

This means it might make sense to transfer a lot of the financial assets to it, for example, company shares can be issued and listed directly on the blockchain.

So how much value is there that could potentially transfer to the blockchain over the next few years?

I don't know.

But we can look at the Total Addressable Market, the total amount of wealth in the global financial system. Of course, not all of it will transfer to the blockchain. But it gives us an idea of the total size of the pie.

There is approximately US\$ 40 trillion of money in circulation. Includes all the physical money, and money in bank accounts. Besides

money, the wealth in the form of securities, investments, derivatives, and other assets exceeds \$1.3 quadrillion.

Have a look at this infographic: [All of the World's Money and Markets in One Visualization](#)⁴⁷.

It will not be long before we see DeFi protocols being more valuable than the largest companies in the world.

- Lucius Fang, Benjamin Hor, Erina Azmi, Khor Win Win, "[How to DeFi: Advanced](#)"

The Blockchain & Energy Technology Will Do to Society and Government What the Internet Did to Communication, Or What the Airplane Did to Transportation (A Quantum Leap)

Up to this day, society, government, politics, law, monetary supply, production, and energy have been analog.

The blockchain and other technologies makes them digital.

Society 2.0 = analog.

Society 3.0 = digital.

And by digital, we mean that the item itself is digital. For example, the US dollar is analog, but Bitcoin is digital. Oil is analog, but Electricity, Solar and Zero Point Energy is digital. Politicians are analog, while blockchain-powered real-time referendums and voting are digital.

Putting an analog item on a computer record does not make it digital - it simply makes it an analog item recorded on computer. For example,

⁴⁷ <https://www.visualcapitalist.com/all-of-the-worlds-money-and-markets-in-one-visualization-2020/>

when you record US dollar transactions on a computer, that doesn't make the dollar digital. The transaction is digital, but the dollar currency itself remains analog.

When you use Bitcoin, the transaction and the currency are all digital.

The items itself is digital. That is Society 3.0. Digital.

Which means politics at the speed of computing, in the hands of the masses and not just the authorities.

Law at the speed of computing, in the hands of the masses and not just the authorities.

Freedom at the speed of computing, in the hands of the masses and not just the authorities.

Communication and cohesion at the speed of computing, in the hands of the masses and not just the authorities.

Trust, integrity, and honesty at the speed of computing, in the hands of the masses and not just the authorities.

Business at the speed of computing, in the hands of the masses and not just the authorities.

Production and distribution of goods at the speed of computing, in the hands of the masses and not just the authorities.

That's the secret to its transformational value.

Centralization is inefficient, bureaucratic, and concentrates power in the hands of a few elites. Yet, it was necessary in an analog society to provide trust and cohesion in the system. At that stage in our evolution, we did indeed need it.

But massive centralization is no longer necessary in a digital society where technology provides better and faster trust and cohesion.

Society 1.0 is what we had before industrialization and agriculture. Humans lived in groups. The group may have had a leader or a council of elders, but there was no concept of regional, national, or global hierarchies, or centralized control.

Society 1.0 was Decentralized (minimal central authorities or producers) and Autonomous (having the freedom to govern itself or control its own affairs, act independently, and produce its own resources etc.).

Society 1.0 became Society 2.0 with the invention of agriculture, industry, and banking. To take advantage of the benefits of agriculture

and industry, society had to centralize and create hierarchies. It gave up freedom in exchange for security and progress.

Decentralization is once again possible, to ever-increasing extents.

The [four pillars of a Decentralized Society](#)⁴⁸ are:

1. Decentralized Communication (Freedom of Thought, Speech and Action)
 - a. Internet
 - b. Cryptography
2. Decentralized Law
 - a. Choice of Law
 - b. Choice of Adjudicator
 - c. Choice of Enforcer
3. Decentralized Production
 - a. Decentralized Energy Production
 - b. Decentralized Materials Production
4. Decentralized Finance
 - a. Decentralized Currencies
 - b. Decentralized Contracts

Think of it this way:

Democracy is valued because it is a necessary ingredient to freedom, right?

Well, if freedom is what gives democracy its value, then anything that adds to freedom should also be welcomed (if not, then we are being hypocritical about our value of freedom, and what we secretly want is a police state).

Decentralization is another ingredient of freedom. That is logical.

Democracy and decentralization can co-exist. They are not mutually exclusive.

Decentralization adds more freedom capability to democracy.

Think about it.

⁴⁸ https://www.youtube.com/watch?v=8oeiOeDq_Nc

The United Nations 2030 Agenda for Sustainable Development (17 Goals to Transform Our World, And Where DeFi Fits In)

The United Nations has come up with [17 Sustainable Development Goals \(SDGs\)](https://sdgs.un.org/)⁴⁹ to transform our world by 2030, and they have been adopted by 193 countries:

- GOAL 1: No Poverty
- GOAL 2: Zero Hunger
- GOAL 3: Good Health and Well-being
- GOAL 4: Quality Education
- GOAL 5: Gender Equality
- GOAL 6: Clean Water and Sanitation
- GOAL 7: Affordable and Clean Energy
- GOAL 8: Decent Work and Economic Growth
- GOAL 9: Industry, Innovation and Infrastructure
- GOAL 10: Reduced Inequality
- GOAL 11: Sustainable Cities and Communities
- GOAL 12: Responsible Consumption and Production
- GOAL 13: Climate Action
- GOAL 14: Life Below Water
- GOAL 15: Life on Land
- GOAL 16: Peace and Justice Strong Institutions
- GOAL 17: Partnerships to achieve the Goal

When you think through this, you might see that some of these are only possible using the blockchain and decentralized finance.

⁴⁹ <https://sdgs.un.org/>

For the first time since the agricultural revolution, humans are approaching a stage where there is an abundance of resources like food, money, and knowledge. Most modern-day shortages are due to allocation inefficiencies, and are rarely a product of real shortages. In the age of information overflow, supply chain optimization, and algorithmic market mechanisms, this inefficiency can be further reduced.

- Shermin Voshmgir, "[Token Economy](#)"

We Are Satoshi

The Will of The People (The Most Powerful Type of Power When United)

In a democracy, power is supposed to reside with the people. Period.

We the people assign our power to government, via elections, and the government represents the people and implements the will of the people. At least in theory. In practice, we all know that special interests interfere with that and make a mockery of democracy.

Power is the ability to make others do what you wish.

There are [6 forms of power](#)⁵⁰ that operate in the civic arena. Therefore, citizens need to understand these 6 forms of power.

1. **Physical force, capacity for violence:** This could be by the State (via police, military) or by Citizenry (includes criminal activity, domestic violence, self-defense, militias, etc.).
2. **Wealth:** Money gives go-power, the ability to purchase results. And to buy almost any other kind of power.
3. **State Action:** Government, via legislation and bureaucracy.
4. **Social Norms:** What other people think is ok. Peer pressure, basically, on a grand scale.
5. **Ideas:** Ideas have great power if they motivate the masses to change their thinking and actions.
6. **Numbers (The Masses):** This is the Will of the People. This power only works when united. That is why “divide and conquer” is its greatest weakness. United, a great number of people with one legitimate voice can upset all the other powers. Think. 7 billion people on Earth today. If they all united, no amount of physical force, wealth, state action, or ideas can oppose them. That is why it is the greatest power, but the hardest to muster (because

⁵⁰ https://www.youtube.com/watch?v=c_Eutci7ack

people aren't united, are often easily divided). Fear is the main tool that splits the numbers. Divide and conquer through fear. Yet, fear is manufactured. False Evidence Appearing Real. People fall for it, and it makes them focus almost exclusively on survival. It shuts down the parasympathetic nervous system and frontal lobe of the brain, so you can't think clearly. And it prepares the body for fight, flight, freeze, and fawn. It overrides rational thought and goes into full blown disempowered scarcity and survival mode. Sheeple mode. Yet, fear is often generated using false narratives, for the sake of controlling people. That's not a secret. We all know that. It is old news.

"There are more things ... likely to frighten us than there are to crush us; we suffer more often in imagination than in reality."

- Seneca, "Letters from A Stoic" 65 AD

In a utopia, we would have cohesion of these 6 powers. Harmony.

In a dystopia, we would have these powers fighting against each other. Disharmony.

Sadly, our world history is one of various forms of oppression and domination. It is only recently that the world started to democratize. We are yet to cease needless wars and so on. We have been carefully mentally programmed to think along extremely narrow lines.

To approach utopia, we must release this fear-based energies.

We must let go of fear-based ways of seeing the world and ourselves. Let go of old thoughts that taught us that sickness, sadness, war, division, discord, disagreement, rage, scarcity, and loss is the norm. That is all simply programming at a mass consciousness. We can drop the programs of limitation. We can rise above survival consciousness and aim to thrive

in peace and prosperity as a whole planet (and not just one country above the rest, at the expense of the rest, if you know what I mean).

And globally, we must make government work for us, with us, by us. As an ally, not an impediment. And for that, we need the will of the people.

"What made the difference in Singapore was that a group of men in 1963/64/65, when we were part of Malaysia, we decided that if we're going to live only one life, if we have to die, then we will die for a cause. That made Singapore possible. We couldn't be placated and settle for less. To settle personally, for a way out for yourself, was easy. You vote in jokers, cranks, weak men, charlatans with some gift of the gab, you run a very serious risk of losing everything you have. Your future really depends on what YOU make of it. The government can give you that framework, can give expression to the will of the people, but the people must have that will. If you don't have it, there is nothing a government can do."

- Lee Kuan Yew, Singapore's founding Prime Minister

The most important causes of change are not to be found in political manifestos or in the pronouncements of dead economists, but in the hidden factors that alter the boundaries where power is exercised. Often, subtle changes in climate, topography, microbes, and

technology alter the logic of violence. They transform the way people organize their livelihoods and defend themselves. Technology is precipitating a revolution in the exercise of power that will destroy the nation-state just as assuredly as gunpowder weapons and the printing press destroyed the monopoly of the medieval Church. If our reasoning is correct, the nation-state will be replaced by new form of sovereignty, some of them unique in history, some reminiscent of the city-states and medieval merchant republics of the premodern world. What was old will be new after the year 2000. And what was unimaginable will be commonplace. As the scale of technology plunges, governments will find that they must compete like corporations for income, charging no more for their services than they are worth to the people who pay for them. The full implications of this change are all but unimaginable.

*- James Dale Davidson, Lord William Rees-Mogg,
[“Sovereign Individual”](#)*

Advocacy networks arise with the disillusionment with traditional political and civic institutions, making them a logical fit for the blockchain community, which is trying to upend how those traditional institutions solve problems.

- Don Tapscott, Alex Tapscott, [“Blockchain Revolution”](#)

We are riding on a huge planetary machine that is on autopilot and accelerating out of control. Money functions mostly without our awareness and in opposition to many of our current needs, placing each of us and life on this planet increasingly at risk. Our collective unconsciousness with regard to money impedes our ability to reach the stop button of this gigantic money-go-round, and has obscured our ability to identify and address the root causes of some of our most serious concerns.

- Bernard Lietaer & Stephen Belgin , [“New Money for a New World”](#)

We are now in the age of the blockchain, of artificial intelligence (AI). Under the wrong hands, without good governance, these two tools could enslave us at a whole new level. They have the power to increase surveillance capitalism and erode our freedoms and privacy even further.

In the right hands, with good governance, if we all participate in building the future instead of burying our heads in the sand and hoping for the best, we can direct these tools, and our future, towards a realistic utopia for everyone.

And that is why waking up and participating in molding our future is so important at this stage, at an individual level. Gone are the days of staying asleep and uninvolved, and hoping a “nanny government” will magically fix everything.

Human Potential Is Powerful Beyond Our Wildest Imagination

I believe that humans are powerful beyond measure, that deep within us all there dwells slumbering powers; powers that would astonish us, powers we never dreamed we possessed, forces that would revolutionize our lives and our home planet if aroused and put into action.

The problem is nobody ever teaches us What We Really are, and how the world really works.

I believe that the traditional education and employment path is fundamentally broken, and with the right wisdom applied, we can live our dreams and transform the lives of others and our home planet.

Together, with each following our unique Calling and applying ourselves, we can herald a better world, a New Earth in a New Energy, a sustainable, thriving, and magnificent future for all humankind and nature.

And the blockchain and DeFi is a fundamental tool towards achieving that goal.

We are the ones we have been waiting for.

If not us, then who?

If not now, then when?

If not here, then where?

We are the ones who will break the chains.

It is we, the Collective, that has the highest power to decide humanity's fate, if we choose to.

You and I must play our part in steering this ship.

United we stand, divided we fall.

Otherwise, it may be steered for us in a direction that may not be for the highest good of all Life.

Paradise Or Oblivion? It Is Our Choice. You And Me.

We are in a new paradigm.

And finally, with the blockchain and DeFi, we have a bulletproof tool to collectively create a better world.

Utopia or dystopia.
Paradise or oblivion.
It is up to us.
I am Satoshi.
You are Satoshi.
We are all Satoshi.

*"I must not fear.
Fear is the mind-killer.
Fear is the little-death that brings total obliteration.
I will face my fear.
I will permit it to pass over me and through me.
And when it has gone past, I will turn the inner eye to
see its path.
Where the fear has gone there will be nothing. Only I
will remain."*

*We always overestimate the change that will occur
in the next two years and underestimate the change
that will occur in the next ten. Don't let yourself be
lulled into inaction.*

- Bill Gates

About The Author

David Cameron Gikandi holds a BSc. in International Business, an MSc. in Information Technology, a Dip. in Film Production, a Microsoft Certified Solution Developer certification, and a Blockchain Revolution in Financial Services specialization from INSEAD.

A creative consultant on *The Secret* (2006) documentary, David Cameron Gikandi is an entrepreneur and a coach/consultant for conscious entrepreneurs and leaders looking to create more impact in their lives. He also helps them decode their essence so they can bring that into their lives, businesses, tribes and societies. He is also the author of the best-selling book *A Happy Pocket Full of Money* and other publications.

David is also a futurist and investor with a keen interest in FinTech and blockchain technology, which he believes will have wide-ranging applications including decentralized finance (DeFi). His core focus and passion are contributing towards a better future for all, and DeFi is an area he especially feels will have a great positive impact on the world.

In DeFi, David is open to working with interested parties looking to create the next level of DeFi solutions. If interested, please visit his website on <https://miraclesfor.me/home/books/money-for-all/> for current collaboration, consulting, and contribution opportunities on DeFi, plus more of his works.

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