



# BITCOIN


## YOUR PORTOFOLIO ARMAGEDDON HEDGE

A calculation of the fair price of Bitcoin within a macroeconomic & probabilistic framework and assessment of its suitability for one's investment portfolio

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## Intro: Me

Hello. I'm not sure what you brought you here. Most likely a misclick – either that or I'm talking to you, Mum.

Whatever the reason, given you will be spending the next 20,000 words reading a jumbled collection of my thoughts on macroeconomics, Bitcoin and frozen yoghurt (I'll explain that one later), I figured I'd give a quick intro about myself. If you just want to read about Bitcoin, skip to Part 1. This isn't relevant to the theme of the paper itself; it just explains a little bit about how I got into Bitcoin and why it grabbed my attention (in a *lot* of words and a very roundabout way).

I am currently living in Medellín, Colombia. It's a city *muy bonita*, tucked away in the middle of a valley, surrounded by mountains on all sides. Its nickname is "*La Ciudad de la Eterna Primavera*" or "The City of the Eternal Spring", due to its temperate year-round climate of 25-28 degrees. It's the Goldilocks of meteorology – not too cold, not too hot. There's zero humidity, too - just the occasional thunderstorm. OK, there are a lot of thunderstorms here, but they pass quickly, and then the sun returns. The sun always returns.

Anyhow, I have written this paper from here, primarily out of jungle-aesthetic cafés (is jungle-aesthetic a word?) and amazing frozen yoghurt restaurants. But I'm not from here; I only moved to Colombia five months ago. I grew up in Dublin, Ireland. I mention all this because, believe it or not, it's pretty important in the context of the paper.

Ireland is a funny country. Don't get me wrong – it's the best place in the world, and I love it with all my heart – but it's also an odd place. Everyone learns Gaeilge (or Gaelic), but almost nobody speaks it. We moan about the rain for 355 days a year. Then, on the ten days of sunshine we get every second summer, we complain that it's too hot and everyone gets sunburned - literally, everyone.

Despite how small we are – there are only 5 million of us weirdos – we have certainly spread ourselves around the globe. Migration is engrained into our confusing history. But stereotypes have also made their way beyond our shores.

Our national holiday, St Patrick's Day, has bizarrely become an international drinking holiday, with bars and brands around the world morphing it into some sort of marketing campaign. For St Patrick's Day this year, I was in Bogotá (capital city of Colombia and a one-hour flight from Medellín) for a couple of days, where I was served a green pint of beer. It was literally green, as in it had green food colouring in it. Apparently they do the same thing in Chicago, too, only instead of beer, they dye the river flowing through the city green.

I talk about all this because, although we may punch above our weight when it comes to amusing stereotypes (which are often true – we certainly like to drink, although the beer is normally yellowy-orange rather than green), most countries – outside Europe anyway - know very little about us. The bulk of our politics, economics and large chunks of our history certainly remain unknown to the majority overseas.

It's the same with most small countries, I guess, and it makes perfect sense. We are a tiny little economy on a tiny little island in the not-so-tiny Atlantic Ocean. Our influence on the global stage is minimal, the exploits of superstar boxer Katie Taylor aside (she just became the first female boxer to headline Madison Square Garden in New York last weekend. Thirty minutes later, she was undisputed lightweight champion of the world – all in a night's work).



I'm not here to complain that Joe Biden gets more press than our Taoiseach (Prime Minister) Micheál Martin – I think it's fair to say that Joey B has significantly more influence on the international stage. The real reason I mention that I grew up in Ireland, aside from flexing that I share a nationality with the undisputed lightweight champion of the world, is what happened 14 years ago.

Because in 2008 (and Mum, if you are reading this, I apologise here), we completely and utterly f\*\*ed it.



# Like an Appendix But At The Start Instead: Ireland

## A Quick History of Ireland

Before getting to Bitcoin, we need to talk about what happened in 2008 in my wonderful and weird little country, and how it set me on a path to working in this strange sector.

Believe it or not, it starts in the year 1845 (I told you, you're more than welcome to skip to Part 1 if you want to just get straight to it).

At this point in time, Ireland has a population of over 8.5 million and is one of the most densely populated countries in Europe. Then something called *Phytophthora infestans* reaches our shores. Within only six years, Ireland suddenly becomes one of the least densely populated countries in Europe, its population down to 6 million.

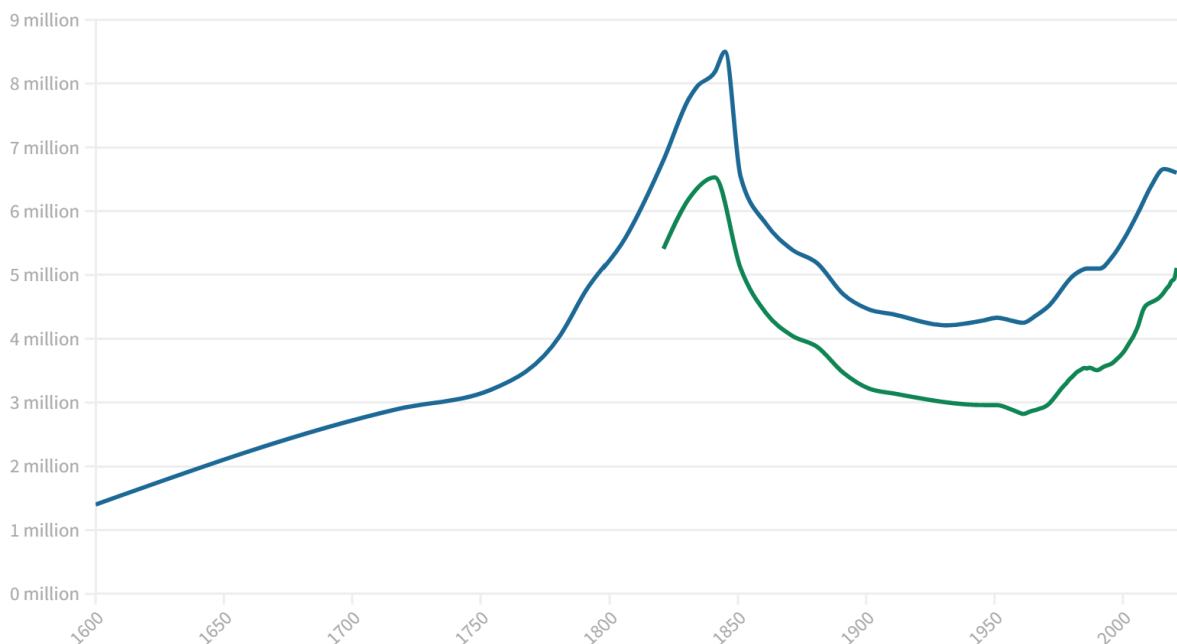
*Phytophthora infestans*, you might be wondering, is not Gaelic for prohibition; rather it is the scientific name for potato blight, a disease which causes rotting of the potato crop. It struck the country in 1845 and kicked off what has since become known as the Great Famine. Close to 1.5 million emigrated, mostly to North America – Boston, New York, Canada. A further one million starved to death.

Boats carrying those who did escape crossed the Atlantic via a treacherous journey taking anywhere from 40 days to three months. These boats became known as “coffin ships”, with death rates varying between 20% and 50%. The legend goes that so many bodies were flung overboard that sharks followed the boats (someone told me this week that Australian media have renamed shark attacks as “negative encounters” to avoid painting sharks in a bad light – good to know Ireland isn't the only odd country on the planet).

## Irish Population

1600 - Present

■ Entire Island (North & Republic) ■ Republic



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## Modern Times & The Celtic Tiger

The net result within a few brutal years was a population of only 6 million (5.1 million excluding Northern Ireland). The steep upward trend of population growth in Ireland had been abruptly reversed. It would continue to decline for over a century thereafter.

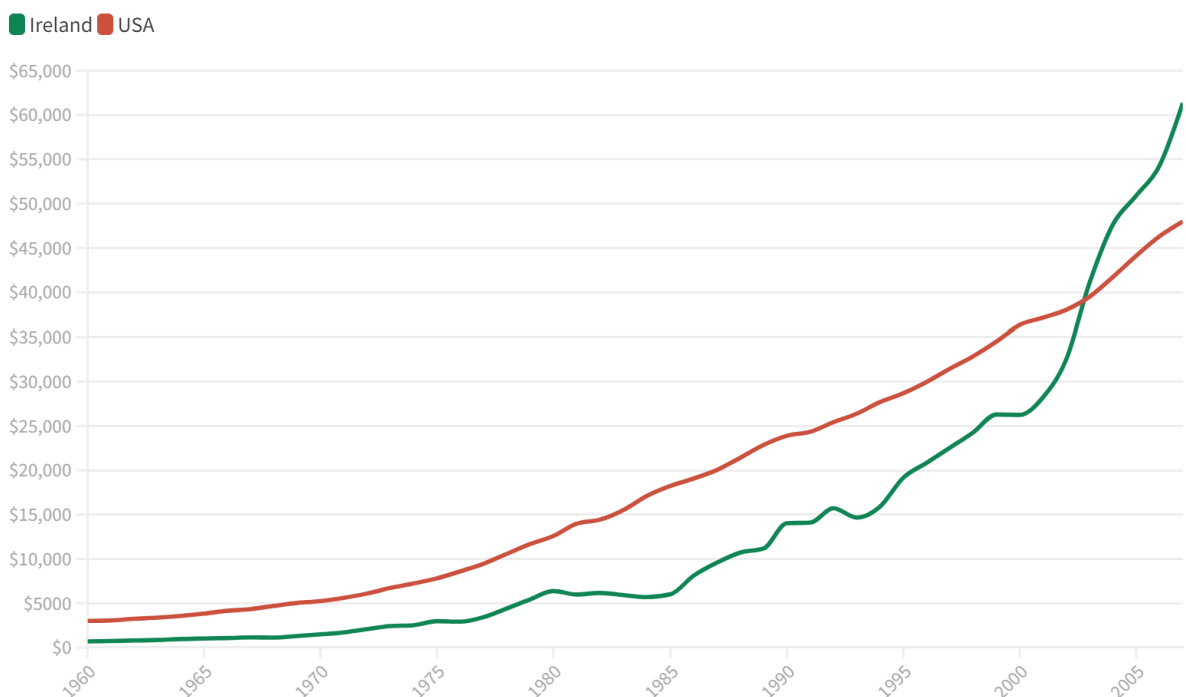
The Irish population was the same in the 1950s as it was in the 1700s. Ireland was the only country in Europe (excluding East Germany) to experience population decline post-war, as young people continued to flood out of the country to pursue greater opportunities overseas.

It was only from the '60s/'70s onwards – as Ireland applied for the EEC/EU and eventually joined in 1973 - that the population began to stabilise and expand, and economic growth started to occur. But even still, Ireland lagged the rest of Europe economically. By the mid-80s, with the population of Ireland at 3.5 million, 1 million still lived below the poverty line.

And then everything changed in the '90s, and I'm not talking about the iconic moment that James Bond became Irish in 1995 (Pierce Brosnan). I'm referring to Ireland's economy exploding to a whole new level. It was a scale of expansion that had never been seen before in Europe, the economy growing nearly 10% annually between 1995 and 2000. Following two centuries of being one of the poorest nations in Europe, Ireland was suddenly among the richest, not only in Europe, but the entire world.

### Nominal GDP per Capita

Ireland vs USA, 1960 - 2007



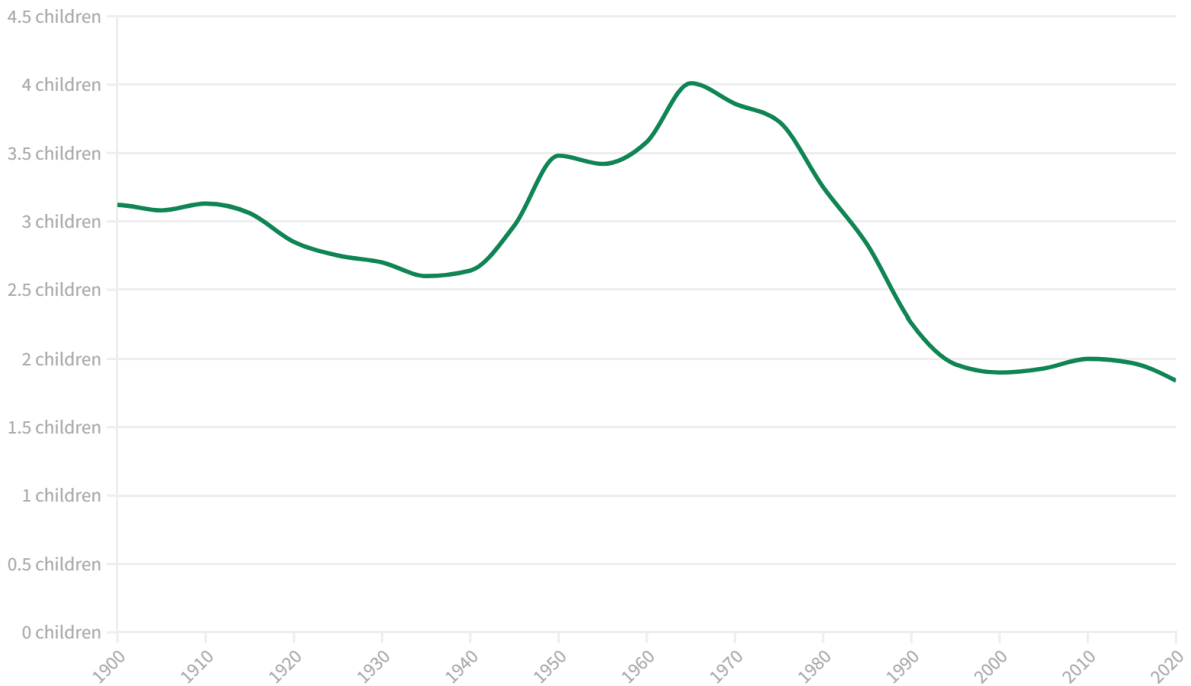
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The reasons for this were plenty. One of the big ones, you might be surprised to hear (or maybe you will be the opposite of surprised) was the Catholic Church and its ... how should I say this... "influence". Contraception was illegal until a controversial vote to overturn it in 1985. And with that, down came the birth rate.



## Irish Fertility Rate

■ Births per Woman



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While emigration affected the timing of the trends in the above chart too (I'm telling you – emigration and Irish history, like peanut butter and jam), the average number of children per Irish woman was 4 in 1965, but it currently sits below 1.8.

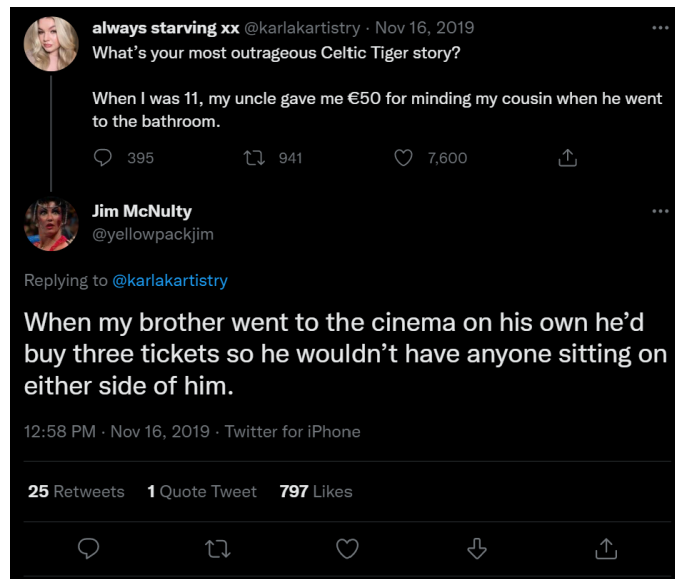
A combination of low wages, EU membership and sound budgeting from the late '80s onward were also key, as Ireland began to modernise itself. The economy started to motor up. And it just kept going.

It wasn't just condoms that were now flowing into Ireland for the first time ever, because foreign investment began pouring into the country, too. This was attracted by all the aforementioned factors, as well as the low corporate tax, government grants, EU funding, peace in Northern Ireland (Good Friday Agreement was signed in 1998) and a well-educated English-speaking workforce – in particular, initiatives put into place in the '60s for free secondary education and grants for third level were now bearing fruit.

By 2007, excluding countries with tiny populations below 100,000, Ireland was the 4<sup>th</sup>-richest country in the world based on GDP per capita, behind only Norway, Qatar and Switzerland. The public learned that *immigration* was not just a typo of *emigration*, it was actually a word in the dictionary because for the first time in history, people were coming *into* Ireland.

This period of outrageous (and unprecedented) economic growth, and all the excess that came with it, became known as the Celtic Tiger.





## Housing

Mortgages were available for over 100% the price of the house – just so, you know, you would have a bit of extra cash for a few chandeliers in the dining room, or perhaps a hot tub on the balcony for those ten days of sun per year that I mentioned earlier.

We could borrow money cheaper than the Germans. The Germans! The economically perfect Germans! Housing prices were going vertical – doubling between 2000 and 2006 alone. Loans were available to anyone who could sign their name. To be honest, I made that up – I doubt you really needed to sign your name.

Mortgage debt went from €16 billion in Q1 of 2003 to €106 billion in Q3 of 2006 – a casual 663% growth in two and a half years. At the start of the '90s, the average house price in Ireland was €60,000, which was just over four times the average wage. During the Celtic Tiger, this peaked at nine times the average salary, whilst in Dublin, it surged beyond twelve times the average salary.

50'000 homes were purchased by Irish people in Bulgaria alone between 2003 and 2007. For perspective, there were a total of 54,000 homes bought in Ireland in 2020. Just to confirm, in case you're confused, Bulgaria is not a suburb of Dublin – I am indeed talking about the country in Eastern Europe, 3,200 kilometres away. 50'000 homes!

I'm laughing as I sit here alone in this café typing these figures; I'm pretty sure the girl next to me thinks I'm *un chico loco*, but the numbers are just hilarious. Loans were pretty much free. The best way of describing it is that houses sort of became like Pokémon cards for adults: people enjoyed collecting them, even if they never really did anything with them (shout out to Charizard).

By 2004, 12% of the country's workforce was employed in construction. Unemployment soon dipped below 4%. The vocabulary of the country expanded, too. The Irish learned many new words: tracker mortgage, walk-in closet and Himalayan sea salt, to name a few.

Remember that statistic about 1 million people out of the 3.5 million population below the poverty line in the 80s? Twenty years later, it was 5%. Ireland had gone from poor to rich. But I mean - really, really, rich. And unlike every other nation, it never got to experience the in-between.





The good times were rolling; everyone thought they would never stop.

And therein lay the problem.

## **The End**

2008. Ooooft. Not a fun year back home. The short answer is that loose credit and reckless banking got (just a *little*) out of control. Shock, horror, you didn't see that coming, did you!?

Business costs and wages were rising, while mortgage debt was going parabolic – but with basement-low interest rates, the repayments were still affordable and the unlimited credit (I genuinely think using the word unlimited is not an exaggeration there) meant you could just slap another mortgage on, sort of like how enough ketchup can make even a terrible burger taste OK.

It all came to a rather abrupt end.

In 2007, residential property demand started dipping. Stories of mortgage fraud were doing the rounds – people overegging their incomes so they could borrow more (as I said, the process was rather loose). Talk of a hard landing was ramping up. Then came the global economic slowdown and the Lehman Brothers collapse in 2008, and the house of cards came crumbling down.

## **Post-Celtic Tiger**

We set some pretty crazy records in the Celtic Tiger era, but the ones from 2008 onwards were even juicier. The highest budget deficit as a percentage of GDP in eurozone history? Oh yeah, baby – how does a fat 32% deficit in 2010 sound, only three years removed from a budget surplus?

What about the Irish Stock Exchange (ISEQ)? It shed over two-thirds of its value in 2008 (for comparison, if you thought 2008 was bad in the US, the Dow was down “only” 34% that year). Three months into 2009, the ISEQ had fallen 82% from its highs. 14 years later and following one of the longest bull markets in history, the ISEQ never reclaimed its highs - it is 36% below those levels, hammering home the scale of the damage.

## **September 29<sup>th</sup>, 2008**

By September 2008, the country was officially in recession. Soon, details started emerging about the financial health of the banks (or lack of, I should say). People started panicking and a run-on-the-banks commenced. The government reacted by upping guarantees on saving accounts from €20,000 to €100,000. But that didn't stop the hysteria.

The night of September 29<sup>th</sup> 2008, ended up being one of the most pivotal in the modern economic history of Ireland. With withdrawals from banks increasing at an alarming rate, and panic spreading through the streets of Dublin like a highly contagious virus (just an innocent, hypothetical analogy), an emergency meeting took place between the big three Irish banks and the government – all behind closed doors.

The meeting ended up going through the night. As Dublin woke up that Monday morning, the staggering outcome was made public: the Irish government was guaranteeing €440 billion (\$633 billion at the time) in deposits and other liabilities at all six Irish banks for the next two years. It would change the texture of the economy going forward.



Read that again - the Irish government was guaranteeing €440 billion (\$633 billion at the time) in deposits **and other liabilities** at all six Irish banks. Not only were deposits guaranteed, but the government had also taken on the banks' private debt as their own. Bonds trading for 40, 45, 50 cents on the dollar pre-announcement were suddenly guaranteed. And the Irish taxpayer was footing the bill – a bill that still hasn't been cleared today.

Anglo Irish Bank's "liquidity problem", as it was called to quell public concern, turned out to be a little more than that. The share price fell 99%. In January 2009, the government were forced to nationalise it, with a mouth-watering €34 billion in losses (\$50.5 billion in January 2009 dollars). Out of €72 billion in loans made, Anglo had lost €34 billion. That's genuinely impressive stuff – a wipeout ratio of 47%. The slimy reptilian executives in charge even ended up in prison, as they mixed in some good old-fashioned accounting fraud and other financial gymnastics.



*In a bizarre coincidence, I actually bumped into one of the executives from Anglo Irish Bank in a park here in Medellín earlier this week*

Remember, my wonderful little country is just that – a *little* country, so let me put Anglo's losses of \$50 billion (€34 billion) in perspective. With the US economy being 59 times bigger than Ireland's (using 2020 GDP figures), this would be the equivalent of an American bank losing \$3 trillion. Lehman Brothers went under with a paltry \$619 billion in debt, five times smaller. And Anglo was only one bank – the others failed, too.



So again, for you Americans reading – you put up some decent numbers in 2008, but you guys weren't even playing in the same league as the Irish boys (and yeah...it was all men in charge at this point).

While Anglo was the worst, the other banks were in *big* trouble, too. Suddenly, saying you worked in a bank carried the same social stigma as telling someone you were a drug dealer by day and burglar by night. Actually, it was probably worse.

The government now owned the banks, which meant they held all the debt. In his 2011 book, "Boomerang, Travels in the New World", Michael Lewis wrote that "*professional credit analyst firms now judge Ireland as the third most likely country in the world to default. Not quite as risky for the global investor as Venezuela, perhaps, but riskier than Iraq. Distinctly third world, in any case*".

After this government guarantee, the Irish taxpayer was forced to pay off €100 billion in banking losses (think nearly \$6 trillion dollars in American terms). A lot of this debt was from abroad, making the sting even harder. And it was all private.

## Bailout

You can probably figure out that these numbers were too big to recover from. After pumping €46 billion into the banks amid the nationalisation effort – around 30% of GDP – Ireland was beyond bankrupt. €60 billion flowed out of the country in the last four months of 2010, and there was nothing left to give.

The country was out of money. Moreover, it was shut out from international lending markets, so it couldn't get any more. As a last resort, in came the IMF, the European Commission and the European Central Bank – known as the European Troika - with a €67.5 billion bailout. Equivalent to over 40% of Irish GDP, it was one of the worst banking crises in history.

There were years of austerity. The interest rates on the bailout, initially at 6%, hit Ireland hard. Unemployment quadrupled to above 15% by 2012. Budget cuts were ruthless – social welfare, child benefits, public sector pay – nobody was safe. VAT increased, so did motor tax, carbon tax – anything you could think of. By 2011, there were 230,000 houses in negative equity out of less than two million total homes in the country.



Irish fans at Euro 2012, shortly after the IMF & EU (A.K.A. German) bailout of €67.5 billion had hit Irish bank accounts.



One in three of the working population under 30 was unemployed. Back came the old scourge of emigration, returning with a vengeance. People were hurting really bad; the country was on its knees. It was a horrible time.

### **I Thought This Was a Bitcoin Paper**

So, what's all this got to do with Bitcoin?

When it all came tumbling down in 2008, I was only a teenager. I didn't understand how the world worked. But this complete meltdown instigated by avaricious bankers, incompetent politicians and mindless greed would hamper my generation for years. The night of that fateful guarantee, I was thirteen years old. Today, my generation is still paying taxes to clear it all up.

Currently, we have a different kind of housing crisis – not enough homes for people to live in and a skyrocketing market again, already beyond the Celtic Tiger highs. Before I left Ireland, my rent and utilities were €1200 per month – and that was for a house with three roommates and minimal sunlight. It was so dark that all my houseplants died. Not to mention one of my roommates used so much shower gel that the rest of us were forced to remove it from the bathroom after we showered and hide it in our rooms (“I thought shower gel was communal, guys, what's the story?”).



*The sad before and after situation of my precious Yucca tree. Three months after the picture on the right, she was entirely brown, withered and officially dead.*



Young people are forced to live at home until their late twenties unless they emigrate. Mortgages are completely unattainable, with standards so tight after overcorrections from the looseness pre-GFC.

And this is all post-recovery, 14 years down the line. The crisis years themselves were back-breaking for the country.

My dad lost his job. We were fine – more than fine – and definitely significantly better than the vast majority of the population, but it was still an eye-opener for me at the age I was at. As a teen, I had never thought about that kind of thing before. It taught me things.

This background of austerity, economic destitution and, finally, recovery – but to a different country than it had been before – was what I grew up with. Then, in 2013, as I sat in university lectures about economics and banking, tax and monetary policy, and as the Irish taxpayer continued to pay off the burdensome bailout, it was revealed that banker salaries at Irish banks had increased between 2008 and 2012. Nice.

Like what we saw around the world, for the most part, those responsible still pocketed their bonuses and it was the ordinary people left to pick up the pieces. Sure, we all got a little carried away, but there were some inexcusable “errors” made by those at the top, fuelled by greed, ego, arrogance or a combination of all three. The fact many still have their pockets lined is the greatest injustice since *Silver Springs* was dropped from the Fleetwood Mac album *Rumours* (it is the perfect counterpart to *Second Hand News*...)

## Bitcoin

All this occurred as I was growing up, learning about economics and how the world works. When I look back on this, I think – and it’s only in writing this paper I have realised this – that the sour taste of the Irish banking collapse instilled an irreverence in me towards the banking sector. And you may be starting to sense where this is going. It begins with B and ends in coin.

It’s startling how so much pain and damage can be caused by so few. A clueless government and abhorrent greed from bankers, who largely remained not only immune to punishment but highly compensated, instilled just that *little* bit of anti-establishment attitude in me. This experience growing up in Ireland morphed my personality a bit, as anyone’s background does. It started as just a little seed of subversion, a hint of rebelliousness. Nothing to do with Bitcoin yet – but that would come.

I first came across Bitcoin in 2017. Like everyone else, I thought it was cool but complicated. It was strange, mysterious, but niche and nerdy. I put a few euro in, played around with it for a while and tried to make a quick buck – a familiar story for any newcomer.

Then COVID hit. Having kept half a passive eye on Bitcoin over the previous few years, I understood it more. I had studied and learned a little bit about how the world worked; I had worked a few jobs; I had lived in a few different countries. The economy started changing – hell, the world did – as this peculiar virus triggered a million different reactions from governments, the public and already-warm printers.

I began to really believe that this nerdy Internet money had a chance to make noise on a macro scale. And I’m not talking about price here – that’s boring. I’m talking about fundamentals; meaningful consequences to real people. An outlet that the ordinary citizen has never had before. My frustration and angst, that had been conceived amid the 2008 financial crisis and had festered ever since, was manifesting itself more and more.



Now here I am, fourteen years on from that government guarantee in 2008, drinking a *smoothie del dia* in my favourite café in Colombia, writing a paper about Bitcoin. A currency that is totally decentralised. Completely democratic, fair and accessible to all. And yeah, living in a developing nation hasn't exactly quelled my interest in Bitcoin (the Colombian peso has inflated 290,051% since 1960).

But I'm not sure I'd be here without the Irish bankers of the early 2000's, setting me along this path.

So, for the record, I'd like to give a warm thank you to the rapaciously greedy bankers that sank my country. From the bottom of my heart, I want to also express my gratitude to the incompetent government and the reckless property developers, and all the other suits who triggered the worst economic crisis in our history.

I, for one, wouldn't be here without you.



## Bitcoin: An Armageddon Hedge (Sort of)

This is the first instalment of a five-part paper in which, to sum it up as accurately as possible, I have gone way down the Bitcoin rabbit hole. I analyse Bitcoin in the context of the broader macro environment, aiming to pinpoint where exactly this asset sits, how and what governs its price action, and what we can conclude about it from looking at other asset classes (specifically credit), as well as past events in financial history.

Then, I'll model its fair price by assessing the different probabilities of various scenarios, and ascertain whether it holds a place in one's investment portfolio.

It all started a couple of months back with this excellent [paper](#) by Greg Foss, a thirty-year veteran of the credit markets – who was also kind enough to arrange a call and talk me through a lot of his logic after I slid into his Twitter DMs uninvited.

Over 20,000 words and multiple dirty excel tabs later, it has turned into a five-part paper on all things Bitcoin, which I have segregated as follows:

- **Part 1: Macro, Macro, Macro:** An assessment of Greg Foss' paper, as well as the current state of the macro environment, the debt crisis and inflation - and what all this means for Bitcoin
- **Part 2: Contagion:** Why I see reminders of the 2008 financial crash and what role Bitcoin can play in hedging your portfolio against the chaos. Featuring this [paper](#) by Mark J Flannery et al. (via University of Pennsylvania Law Review)
- **Part 3: The Hedge:** An assessment of whether Bitcoin has the properties required to protect oneself against financial meltdown
- **Part 4: Global Reserve Currency:** An examination into the erosion of the dollar as the global reserve currency, quoting from an IMF [paper](#) released last month (yeah, using an IMF study in a Bitcoin paper, I know...)
- **Part 5: Bitcoin Pricing Model:** Using all the information from the four three parts, as well as Foss' paper (and don't forget our little cameo appearance by the IMF), I put together a model trying to pinpoint the intrinsic value of Bitcoin. And you, the reader (who, if you get to this point, I commend you, but also kind of pity you), can play around with the scenarios and see what price you arrive at. And yeah, it's possible to model it up and get an intrinsic value of \$0, before you ask.

The overriding goal of these articles is to assess Bitcoin's place amid the macro environment and what potential role it could play in one's investment portfolio, while ascertaining what economic history, including the 2008 financial crash, tells us before calculating Bitcoin's fair price.

And one last point - for any Bitcoin haters, please read on. This is structured as an examination of Bitcoin against other asset classes, and I'd love to hear any disagreements, feedback or challenges on any of my points. This isn't a head-in-the-sand, *Bitcoin fixes the world and I won't hear anything else about it* kind of paper.

Anyhow, let's get started.



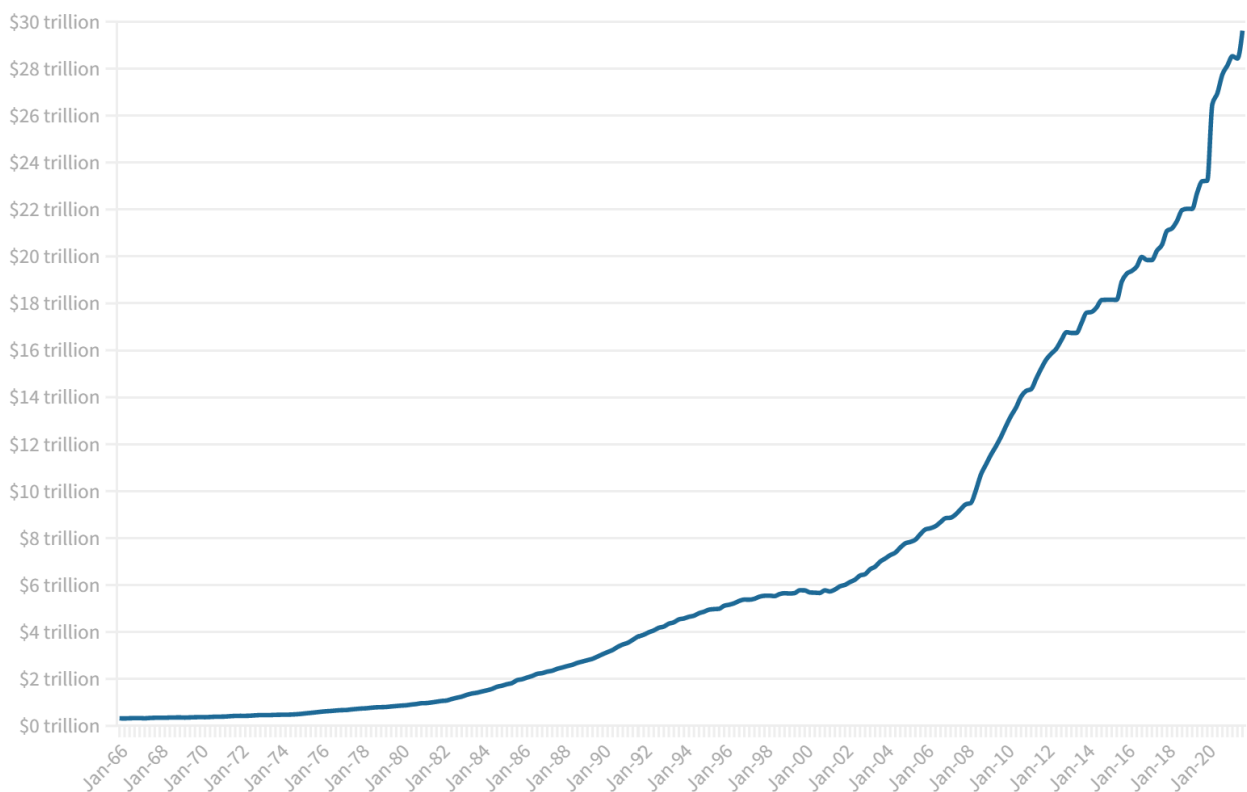
## Part 1: Macro, Macro, Macro:

One asset class that presents as a particularly poignant reference case for Bitcoin amid the current environment is credit. More specifically, how the credit market and Bitcoin will react going forward, following the unprecedented climate of quantitative easing that we have experienced.

### Debt...Lots and Lots of Debt

The numbers are so large it's hard to interpret – but yes, the below graph shows US debt recently hit \$30 trillion (updated numbers have it above \$31.5 trillion). It's a colossal number (that's thirteen zeroes after the 3, if you're getting dizzy) and begs the important question – how is it repaid?

■ Total Public Debt, USA (\$ trillion)



@DanniiAshmore

US debt (in millions) via [tradingeconomics.com](https://tradingeconomics.com)

Well, one solution immediately springs to mind: money printing. The problem, however, is that money printing has already been happening at a historic rate, while inflation is rightfully causing alarm bells (coming in at [7.2%](#), [7.9%](#), [8.5%](#), [8.3%](#) and [8.6%](#) for January, February, March, April and May - I hope you stocked up on toilet paper while you had the chance).

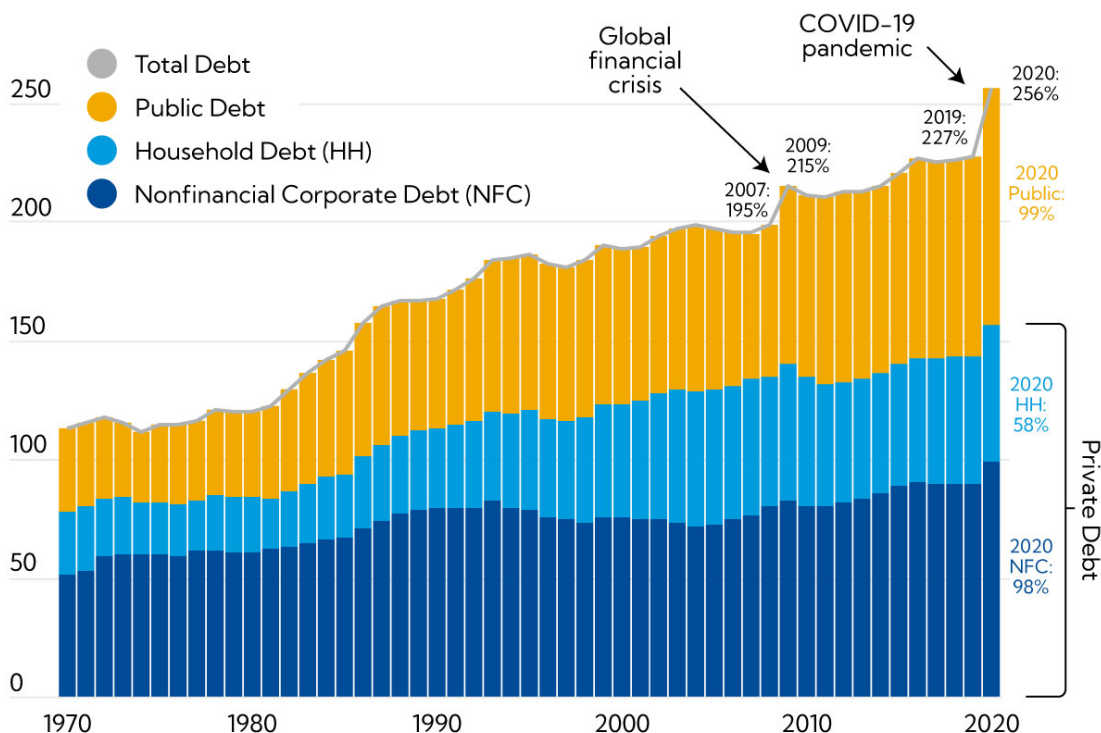
For the avoidance of doubt, this spiralling debt is not limited to the US; debt across the world has been rising, even before the pandemic. But in 2020, global debt experienced its largest surge in 50 years as a percent of GDP. According to [IMF.org](https://www.imf.org), global debt ended 2020 at a lofty 256% of GDP – only to be inflated even more during 2021.





## Historic highs

In 2020, global debt experienced the largest surge in 50 years.  
(debt as a percent of GDP)



Sources: IMF Global Debt Database and IMF staff calculations.  
Note: The estimated ratios of global debt to GDP are weighted by each country's GDP in US dollars.



### Debt-to-GDP

Greg Foss, with decades of experience in the credit markets, took a look at this problem in his fascinating [paper](#). It's a captivating dive into Bitcoin, credit and the correlation between them, as well as how the assets will move going forward. Let's take a look at some of the numbers he presented and see what we think:

Foss estimated the updated debt-to-GDP ratio as closer to 4X following the continued money printing recently. I dug around on the Internet and for whatever reason, the updated global debt is quite tricky to find (@IMF, help me out people?). The most recent figures from the IMF date from the end of Q2 in 2021, putting debt-to-GDP at 3.53X. It's frustrating that I can't obtain an updated figure, but 4X does appear reasonable in this context, if not a little on the low side.

Foss made a high-level assumption that the average coupon (or, in layman's terms, the annual repayments that governments are required to make on the debt) is 3% (which seems a little conservative to me if anything).

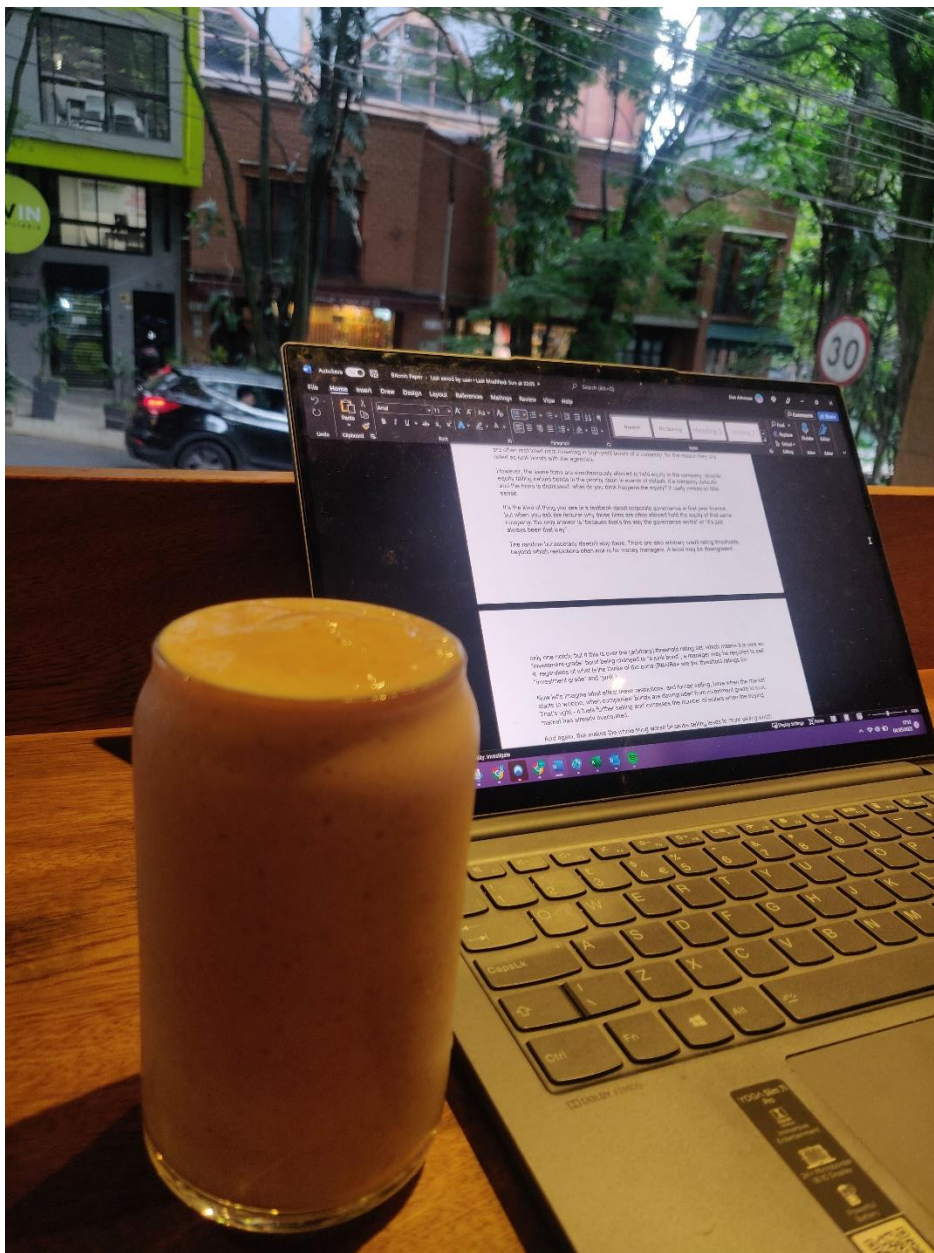
So, if debt repayments are 3% per year, and debt is 4X the size of GDP, simple maths concludes that the global economy needs to expand at 12% annually to keep the tax base in line with the debt balance. A scary conclusion (sidenote: if you ever see me advocating for a



bond purchase, call for help - I've been kidnapped, and someone is tweeting from my account).

This 12% conclusion is via an oversimplified equation, of course, but that doesn't mean it doesn't have potentially profound implications – and it is merely a tool that contextualises the sheer amount of global debt right now. For curiosity, should we take the 3.53X debt-to-GDP figure of Q2 2021, it still translates to a lofty 10.6% required growth (if you think the coupon of 3% is too conservative, bumping it to 3.5% gets you required growth rates of 12.4%/14% at debt ratios of 3.53X/4X).

Hence, it's not surprising that there are increasing clamours that we have a debt crisis on our hands. What's more, our cute little equation doesn't even account for any increasing deficits to wade off COVID-inspired recessions.



*Just had to interject here – this smoothie del dia is outrageously good. The oats to fruit ratio has been absolutely perfected*



## Circular Loop

*“In a debt/GDP spiral, the Fiat currency becomes the error term. Printing more Fiat is the only solution that balances the growth in the numerator relative to the denominator. When more Fiat is printed, the value of the outstanding Fiat is debased. It is circular. Error terms imply an impurity in the formula”.*

The above is the critical point from Foss’ paper– a never-ending cycle of Fiat debasement. So, even if you are confident that default will not occur, the value of the money you receive back when the debt matures in future will not be the same as it is now; it will be debased (again, just to be clear - if you ever see me posting positively about bonds, please call the police and softly break the news to my Mum that I won’t be coming home anytime soon).

I mentioned the headline-grabbing inflation numbers earlier, but it’s important to remember that those are the CPI numbers, which are highly misleading. It reminds me of living in Toronto and going out for food or drinks. The menu says \$7 for a beer, but in reality, that is \$7.21 with tax and \$8.61 with tip. Or is the tip 15% rather than 20%? And is the tip percentage added on before or after the tax is included? I have no idea – all I know is that the number coming out of my bank account is not the \$7 printed on the menu; it’s significantly more.

The CPI number is like that \$7 menu number – it simply fails to reflect the reality of the inflation we are all witnessing. I’m already trying to avoid this piece turning into a novel, so if my highly scientific explanation is not good enough, you can read more about why CPI is a flawed metric to measure inflation [here](#) (P.S. Jayson, if you’re reading this, you know I love Canada; it’s nothing personal- poutine deserves more recognition in mainstream media, and it pains me that I can’t get it back home. But seriously, include tax on the menu prices, please).

## Inflationary Effects

The IMF published a [report](#) this month assessing the burden of global debt, and it warns of issues ahead, largely in line with the above thought (the debt, that is, not the poutine). “Until recently, low debt service costs assuaged concerns about advanced economies’ record-high public debt”, the report states (I inserted that hyphen, the original quote didn’t have it. IMF – sort your grammar out, come on).

The report cites basement-level nominal interest rates and the fact that neutral real interest rates were on a significant downward trend in many economies, “including the United States, the euro area, and Japan, as well as a number of emerging markets”.

With real interest rates below real growth rates, it created “a perception of painless fiscal expansion” - which was certainly the prevailing thought. Modern Monetary Theory (MMT) is the sexy name coined for this even-sexier concept of unlimited fiscal expansion being OK, because governments cannot go broke if they are monetarily sovereign. This theory of MMT even became quasi-accepted pre-pandemic in certain academic circles (I won’t name any names).

Proponents of MMT (MMT-ers? MMT enthusiasts? Psychopaths?) argue that countries can have large debt balances without any ill effects and that significant deficits can be sustained so long as the government can print money (Japan and their huge debt balance is often used as an example). An oft-repeated line is that not running large deficits is counterproductive because it restrains people from building savings and can trigger recessions.

The only limit to spending is real resources, and taxes serve to take money out of the economy in order to rein in inflation, rather than fund projects such as healthcare, public goods and infrastructure. In that way, inflation can be curtailed.



I've often had this debate with my good friend Mark Daly, who works for Bloomberg (yeah, I'm name-dropping to the max here). My argument is almost too simple, but even the most complicated concepts can often be boiled down to basic logic. And it's this: you can't print more money than at any other point in history without getting inflation.

It seems obvious, but people believed we could. The perception of “painless fiscal expansion” being possible has now changed, however, according to the IMF. The report continues, “although inflation surprises may lower debt-to-GDP ratios in the short-run, persistent inflation—and inflation volatility—ultimately can raise the cost of borrowing. This process can happen quickly in countries with short debt maturities”.

To close off part 1, and drive the hammer home, once and for all, on how big a problem this debt is, take a read of the following excerpt from the [Wikipedia](#) page on the US debt clock:

*“The National Debt Clock is a billboard-sized running total display that shows the United States gross national debt and each American family's share of the debt. It is currently installed on the western side of One Bryant Park, west of Sixth Avenue between 42nd and 43rd Streets in Manhattan, New York City”.*



Yeesh

The Wikipedia article continues, *“In 2008, the U.S. national debt exceeded \$10 trillion, one more digit than the clock could display. The lit dollar sign in the clock's leftmost digit position was later changed to the “1” digit to represent the ten-trillionth place”.*

So, in what you'd be tempted to call poignant symbolism, they had to alter the clock to fit an extra digit in 2008 when the debt hit \$10 trillion. In the 14 years since, the debt has multiplied 3X and counting. This time, it might take more than a hammer and nail to fix it.



# Bitcoin: An Armageddon Hedge (Sort of):

## Part 2: Contagion

This is the second instalment of a five-part paper, where I continue to write about something I spend far too much time on to begin with: Bitcoin. Well actually, Bitcoin wasn't mentioned all that much in Part 1, now that I think about it.

You will need to read my ramblings in Part 1 before this, by the way, as this part continues on from the macro discussed there. To sum it up, I essentially outlined how big the global debt problem is (but took far too many words to do so).

The overall goal of the paper remains the same. I'll analyse Bitcoin in the context of the broader macro environment, aiming to pinpoint where exactly it sits and whether it is suitable for one's investment portfolio. This chapter really ramps up the use of the bond market as a benchmark, and how an event from a certain year in recent history may be highly relevant (spoiler alert: it's the year 2008 - and I'm not referring to the release of the first Twilight movie, albeit a watershed moment for both Robert Pattinson's career - now he's Batman! - and society at large).

Anyhow, we're already one-fifth of the way through these 20,000 words, and don't forget the riveting excel model, which is the pot of gold at the end of the rainbow! (Side note, is it time to change that expression to "pot of Bitcoin private keys at the end of the rainbow?" Someone ask [Peter Schiff](#)).

As outlined in Part 1, this is a five-part paper which I have segregated as follows:

- **Part 1: Macro, Macro, Macro:** An assessment of Greg Foss' paper, as well as the current state of the macro environment, the debt crisis and inflation - and what all this means for Bitcoin
- **Part 2: Contagion:** Why I see reminders of the 2008 financial crash and what role Bitcoin can play in hedging your portfolio against the chaos. Featuring this [paper](#) by Mark J Flannery et al. (via University of Pennsylvania Law Review)
- **Part 3: The Hedge:** An assessment of whether Bitcoin has the properties required to protect oneself against financial meltdown
- **Part 4: Global Reserve Currency:** An examination into the erosion of USD as the global reserve currency, quoting from an IMF [paper](#) released last month, and analysing whether Bitcoin could step up to fill the void
- **Part 5: Bitcoin Pricing Model:** Using all the information from the first three parts, as well as several academic papers, I put together a model trying to pinpoint the intrinsic value of Bitcoin. And you, my precious reader, can play around with the scenarios and see what value you arrive at. Maybe it's the same as mine as we can celebrate together in a harmonious echo chamber, discussing how the whole world is wrong, but we are correct?

But for the love of ~~God~~ Satoshi, that's enough procrastination; let's crack on with Part 2.



## Part 2: Contagion

With all this fiat debasement already occurring, what if there was a way to hedge the exposure of these contractual debt obligations? What if we had some special form of money, living outside the realm of sovereign control, immune to political desires and monetary manipulation?

Well, we kind of do. It's called Bitcoin.

Why lose 8.5% of your net worth per year to inflation when you can lose 50% holding Bitcoin in a week? But hold on to your horses; that's coming later in the paper.

### Great Financial Crisis & CDS Spreads

This is where it gets very interesting, because we have something extremely valuable here: precedent. Foss points out in his [paper](#) that you could have purchased default protection on Lehman Brothers for 9bps (that is 0.09%, so paying \$9k would have insured you against defaults up to \$10 million on Lehman— LOL). This protection, of course, was available via the credit default swaps (CDS contracts) featured in The Big Short movie ("[just don't f\\*\\*cking dance](#)" - best scene in the film, am I right?).

While countries like the US are highly unlikely to default anytime soon (I'm not a maniac), they don't need to default entirely. The critical point is that CDS contracts, such as the previous Lehman example, *still make money when spreads widen*. And spreads widen when default risk merely increases, not just when defaults occur. That is worth repeating: we don't need a country to actually default in order to make a return; we just need the **chance of a default to increase**.

What takes this analysis up a notch is what happens next. We will see that same pattern again – the vicious circle. Because as CDS spreads widen, there can be a domino effect. The most critical word in all of credit (and finance, really) is **contagion**. And that's what this part is going to focus on.

### Credit Holds the Match

Contagion is what caused havoc in 2008; there is no reason to believe it cannot happen again. To quote the Big Short once more, you will remember Margot Robbie in a bathtub explaining sub-prime loans and how CDS contracts were used to bet against defaults. Now, my words on your screen may not be as fun to look at as she was, but the truth is similar – contagion spreads like wildfire, and it's impossible to stop once it starts (that would definitely sound more dramatic if declared by Margot Robbie in her Aussie accent, but she didn't answer my DMs when I asked if she would like to help out with this paper).

Furthermore, the bond market is roughly about three times the size of the equity market (the latest figures I could find were Q3 of 2021 for public stock markets, when they were worth \$41.8 trillion, while at the end of [2020](#), the global bond market was worth \$123.5 trillion). This is important because it affects the extent of the contagion. It follows that if the credit markets wobble, the whole house does; credit is the foundation that holds up the entire structure. This house we are all living in is doused in gasoline – see Part 1 - and the credit sector is smoking a cigarette in the basement, hoping nobody notices.

### 2008 Comparison

So, we saw in Part 1 that global debt as a percentage of GDP is at 353%. In 2008, this was 280%. So, 14 years from the biggest financial crisis in recent memory, which we now look



back upon and blame on reckless lending and dangerous leverage, global borrowing has soared comfortably past those levels.

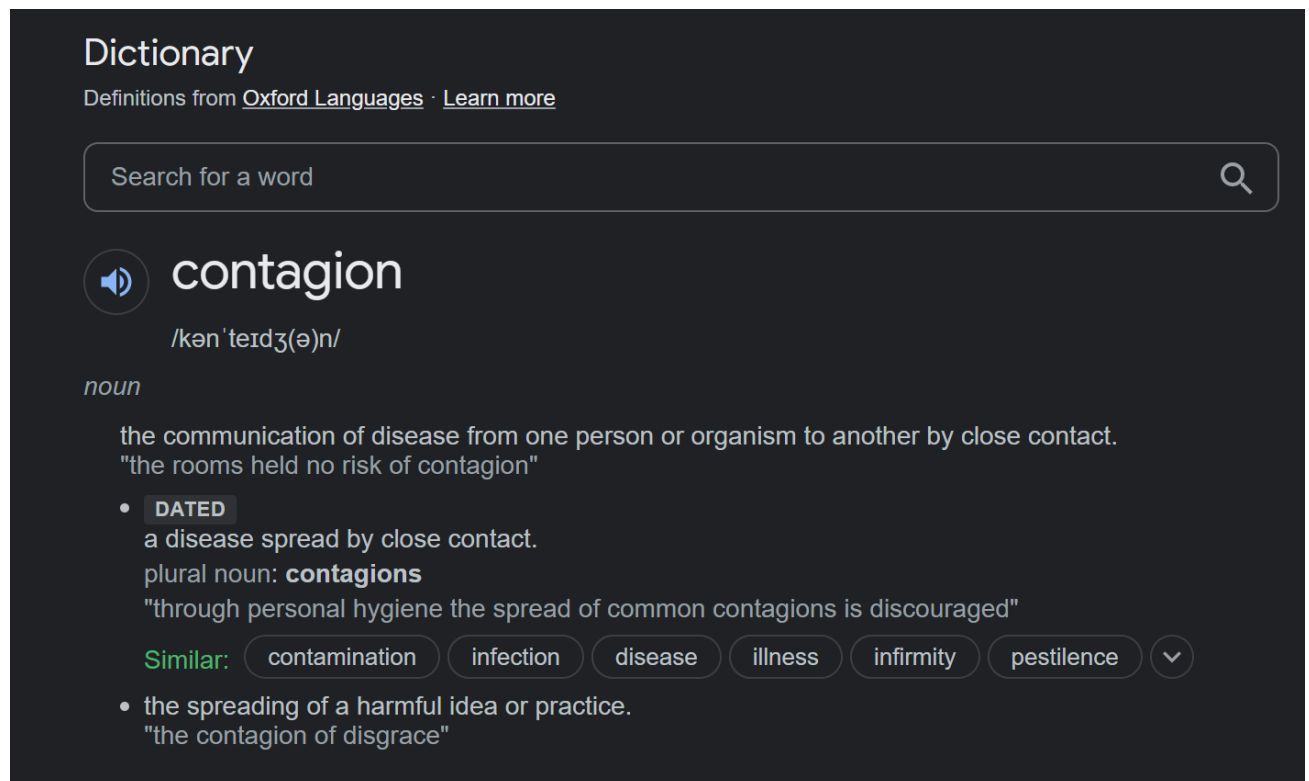
*“How many ears must one man have, before he can hear people cry?”* – Bob Dylan serenading Jerome Powell on Blowin’ in the Wind.

## Contagion

*“The level of sovereign CDS effectively sets a base spread for which all other credits will be bound. In other words, it is unlikely that the spreads of any financial institution will trade inside the CDS for the jurisdictional sovereign. Same all down the line. Therefore, a widening of sovereign CDS leads to a cascading effect down the credit spectrum. CONTAGION, both inter-country and within a specific country.”*

Let’s dissect this quote from Foss’ paper a bit. He says that if the sovereign bond spreads widen (i.e. if the market-assigned probability of a government defaulting on their debt increases), then this will trigger a widening of the spreads for corporate bonds contained within that country, as investors require more compensation for the supposed higher risk. In other words, credit instruments within a country will not trade at a tighter spread than the sovereign bond of that same country. This is empirically true and has been for a long time.

For example, Apple bonds will never trade at a tighter spread than US sovereign bonds – the sovereign bonds will always be at least as tight. Or put another way (this stuff is dense, give me a break), the market will never price the chance of default of a company as less than the chance of default of the country in which that company is based. So, if the sovereign bond spreads widen via a perceived increased possibility of default, other credits will follow. Or, more simply, we get contagion (teaser: that won’t be the last time I mention contagion).



The image shows a screenshot of the Oxford Languages dictionary entry for the word "contagion". At the top, it says "Dictionary" and "Definitions from Oxford Languages · Learn more". Below that is a search bar with the text "Search for a word". The word "contagion" is displayed in a large font, with a speaker icon to its left. Below the word is its phonetic transcription: /kən'teɪdʒ(ə)n/. The word is identified as a "noun". The definition is: "the communication of disease from one person or organism to another by close contact." An example sentence is provided: "the rooms held no risk of contagion". A "DATED" label is present, followed by the definition: "a disease spread by close contact." The plural noun is given as "contagions", with an example sentence: "through personal hygiene the spread of common contagions is discouraged". A "Similar:" section lists related terms: "contamination", "infection", "disease", "illness", "infirmity", and "pestilence". A final definition is provided: "the spreading of a harmful idea or practice." with an example sentence: "the contagion of disgrace".

*Out of curiosity, I googled what the dictionary has to say about contagion. For some reason, I kind of get déjà vu when reading that definition...*



## Rating Agencies

There are still bureaucratic barriers within credit markets that weaken the foundations upon which the market stands. An example - also pointed out in Foss' paper - is how firms are often restricted from investing in high-yield bonds of a company for the reason they are rated as junk bonds by the agencies.

However, the same firms are simultaneously allowed to hold equity in the company, despite equity falling behind bonds on the priority chain in an event of default. If a company defaults and the bond is distressed, what do you think happens to the equity? It really makes so little sense.

The random bureaucracy doesn't stop there. There are also arbitrary credit rating thresholds, beyond which restrictions often kick in for money managers. A bond may be downgraded only one notch, but if this is over the (arbitrary) threshold rating set, which means it is now an "investment-grade" bond being changed to "a junk bond", a manager may be required to sell it, regardless of what (s)he thinks of the bond (BB+/Ba+ are the threshold ratings for "investment grade" and "junk").

Now let's imagine what effect these restrictions and forced selling have when the market starts to wobble, when companies' bonds are downgraded from investment grade to junk. That's right - it fuels further selling and increases the number of sellers when the buying market has already evaporated.

And again, this makes the whole thing worse because selling leads to *more selling* which leads to *panic*, which leads to *more panic*, and it's all a vicious circle, like what we saw in the 2008 crash. **Contagion** <- Hey, there's that word again! And this time, unlike in 2008, we won't even have a Twilight movie to cheer us up because Robert Pattinson is off doing what every other actor on the planet is doing...dressing up in latex and rebooting superhero franchises.



*2008: back before she cheated on him, he became Batman and when the world only had a Debt/GDP ratio of 2.8X. A.K.A the good old days.*





## Bureaucracy

Foss also mentioned similar points in his paper (although I don't believe Twilight made the cut - he must have had a stricter word count). But for me, it just symbolises a lot of the friction and nonsense that still happens in the trad-fi world. It's this kind of bureaucracy that frustrates me about the traditional finance market because, much like those toasters that can't fit a piece of regular-sized bread in them, it just doesn't make sense (seriously, I cannot figure out why toasters are sold that cannot fit...toast. Am I missing some other use cases of a toaster?).

But it's simply that way because it's always been that way –unfortunate reasoning given quite often on Wall Street. Even after the lessons of the GFC, some things don't seem to have changed.

I don't consider myself a narrow-minded Bitcoin evangelical or anything; I like to think I listen to both sides of the argument (despite the increasingly unhinged paper here, you think to yourself). But I have zero time for - and this is in general, not just the world of finance - meaningless rules that are there purely for the sake of being there. It's just that finance is a big case of this.

And it's this kind of entrenched pointlessness and bureaucracy - "because that's the way it's always been done" - that is commonplace in trad-fi and Wall Street, as it suits those at the top who wrote the rules in the first place. When looking at the threat of contagion and a crash, these arbitrary rules just add gasoline and make the whole thing more dangerous. And if it's hard for you to imagine, just think back to 2008.

## 2008 Spreads

Right, right, right, you get it – contagion. Let's park the discussion of contagion there for a minute and put our Michael Burry hats on.

Why don't we compare what the rating agencies say about sovereign bonds to what the market is saying? Surely – surely! – they are in equilibrium after the embarrassment they endured as a result of the GFC. And if they are way out of whack, maybe we can short the whole thing and sell the rights to Hollywood for a Big Short sequel? (I believe this is the third Big Short reference of this paper, so I have officially reached capacity and can confirm there will be no more).

Foss' paper looks at three countries: USA, Canada and Portugal. Let's stick with his example.

Country	Rating	5Y CDS	PD
Canada	AAA	33.3	0.54%
United States	AA+	16.1	0.26%
Portugal	BBB	57.7	0.70%

*PD = Implied probability of default, based on a 40% recovery rate*

*Data via worldgovernmentbonds.com*

I pulled the updated data off [worldgovernmentbonds.com](http://worldgovernmentbonds.com), which shows various countries' CDS spreads and credit ratings. If you're confused looking at that table of spreads, I'm not surprised, because you should be. Canada has the highest credit rating, yet according to the markets, there is over double the chance of default there compared to the US.

This is unequivocal proof that, much like the GFC, something is amiss here. Have agencies not learned their lessons, or is the market...broken? It's akin to the Oscars continuing to award movies that nobody likes. What exactly are the rating agencies watching? (Proud of myself for



referencing the Oscars and not making a Will Smith joke, by the way. That would have been too easy, and I don't condone inter-celebrity violence at such an esteemed event as the Oscars).

It's alarming that just over a decade after the crisis, we have credit ratings out of whack again, especially when thinking about the bureaucratic importance and restrictions on traders that are anchored to these ratings (which, again, is stupid in itself). Look at Portugal – BBB rating with 57 bps, in a different stratosphere than the American counterparts. Which also seems strange given the inherent German (or EU, to use the correct term) backing.

These agencies are meant to be a risk management tool for investors and the market alike, but they wouldn't know risk quantification if it got up and slapped them in the face (I changed my mind, I couldn't resist. The guy slapped someone live at the Oscars! Iconic! Best live TV moment since Richard Sherman's [incredible rant](#) in the NFL playoffs).

And if you're sceptical about the superior ability of CDS spreads to predict defaults compared to credit ratings, I would suggest this [paper](#) by Mark J Flannery et al. (via University of Pennsylvania Law Review), which was published in 2010 amid market turmoil.

*"It is apparent that CDS spreads reflect available information, which makes them useful for regulatory and risk management purposes"* - I think of this as similar to a group of friends sitting in a pub giving their verdict on who will win an upcoming football match. They can talk about the fact that Jurgen Klopp likes to play with a high backline, or that the only thing holding Newcastle striker Callum Wilson back from a Ballon d'Or is injuries, all they want.

The reality is that if I want to find out the realistic probabilities, I simply need to check the bookmakers' odds (unless Bruno Guimarães is playing because he's just unstoppable). The bookie is essentially the open market, which will give you the realistic odds, sort of akin to the [Efficient Market Hypothesis](#).

Why wouldn't you trust that over a punter in a pub? Otherwise, punters would make money, and last time I checked, bookmakers were doing quite well (nine of twenty Premier League clubs are currently sponsored by betting companies).

Like many things in industries dominated by old, white men who have been in their jobs a very long time (ooh, are we getting political here?), ego has a lot to do with it.

*"I can beat the bookies because I'm smart and I like football and I watch it a lot and I feel like Joelinton will maul Jordan Henderson in midfield,"* he says as he slurps a pint of Carling and munches on a stale bag of ready salted Kings crisps. Do you know how much money Paddy Power make off this kind of thinking? (and honestly, ready salted has got to go).

*"CDS spreads are wrong and we can print money to monetise the debt and they're all just conspiracy theorists and Modern Monetary Theory is the new way to go so let's slap an AAA rating on it and smile and print GO on the money printer"* - do you know how dangerous this is?

So yeah, I don't know what is going on at the credit rating agencies. Maybe they have a fetish for public embarrassment, and 2008 wasn't quite enough. Or perhaps they're right this time, and the market is wrong?

*"At a minimum, our analysis supports the conclusion that CDS spreads reflect information more quickly and accurately than credit ratings. Specifically, we find that as information about the subprime mortgage exposure of financial institutions was disclosed during 2007 and 2008,*



*CDS spreads reflected that information, whereas credit ratings remained relatively unchanged”.*

The data is all there. It happened in 2008, *“If regulators and investors had looked to CDS spreads to assess the riskiness of financial institutions during this period, they would have found as early as April 2007 that such risks were significant and increasing. By early 2008, CDS spreads reflected a significant likelihood of default by one or more investment banks. In contrast, credit ratings reflected little or none of this information”.*

Does my own Sherman-esque rant against these agencies feel a bit more justified now?

Right, I think it’s definitely time to close this part out - it’s rapidly descending into a therapy session. Let’s move on from my habit of judging people by what flavour crisps they eat and get to the next part. It’s time to finally have a look at Bitcoin.



# Bitcoin: An Armageddon Hedge (Sort of):

## Part 3: The Hedge

This is the third instalment of a five-part paper, where I finally circle back around and tie all this rambling to Bitcoin. Parts 1 and 2 were before this, and I continue on from the macro discussed there, specifically the debt crisis and the potential for contagion.

Right, so we've got the macro stuff out of the way now. It's time to investigate whether Bitcoin can help evade some of the above problems or whether it's all overhyped and worthless, and we can just go home and forget about it.

So, yup - below are the contents if you don't know by now:

- **Part 1: Macro, Macro, Macro:** An assessment of Greg Foss' paper, as well as the current state of the macro environment, the debt crisis and inflation - and what all this means for Bitcoin.
- **Part 2: Contagion:** Why I see reminders of the 2008 financial crash, and what role Bitcoin can play in hedging your portfolio against the chaos.
- **Part 3: The Hedge:** (You are **HERE!**) An assessment of whether Bitcoin has the properties required to protect oneself against the madness.
- **Part 4: Global Reserve Currency:** An examination into the erosion of the dollar as the global reserve currency, quoting from an IMF [paper](#) released last month, and analysing whether Bitcoin could step up to fill the void.
- **Part 5: Bitcoin Pricing Model:** Using all the information from the first four parts, as well as several academic papers, I put together a model trying to pinpoint the intrinsic value of Bitcoin, which you, the reader, can play around with yourself (you can manipulate the data all you like to confirm preconceived notions – tweakable models are great for that!).

The overriding goal of the paper remains the same - to assess Bitcoin's place amid the macro environment, assess its suitability for one's investment portfolio, and calculate its fair price.

Let's kick into Part 3.



## Part 3: The Hedge

### 21 Million

Bitcoin has one attribute that no fiat currency does - a hard supply cap. There will only ever be 21 million bitcoins in the world, and that's as objectively true as the fact that Harry Potter is the best book ever written. By the way, I'm of the strong belief that people who don't cite Harry Potter as their favourite book are just kidding themselves, perhaps because it's seen as an uncool answer. Or, maybe, JK Rowling has put them off with all her crazy talk since she released the books. But I've never had as much fun reading anything as I did Harry Potter, so yeah - it's the best book ever written.

It seems bizarrely simple, and it kind of is, but Bitcoin's hard supply cap is what sets it apart. Humanity has literally never had this option before. As we saw in Part 1 and 2, inflation, money printing and debt has created an incredibly dangerous cocktail (when I was in Montréal, a friend bought pure alcohol, which can actually kill you. Sorta like that, I guess).

You can't print more bitcoins. I can't print more bitcoins. Hell, even Jerome Powell can't, and that guy loves a good bash on the printer. It's literally not possible, because it's coded into the blockchain and can never be changed. It's cold, hard maths.

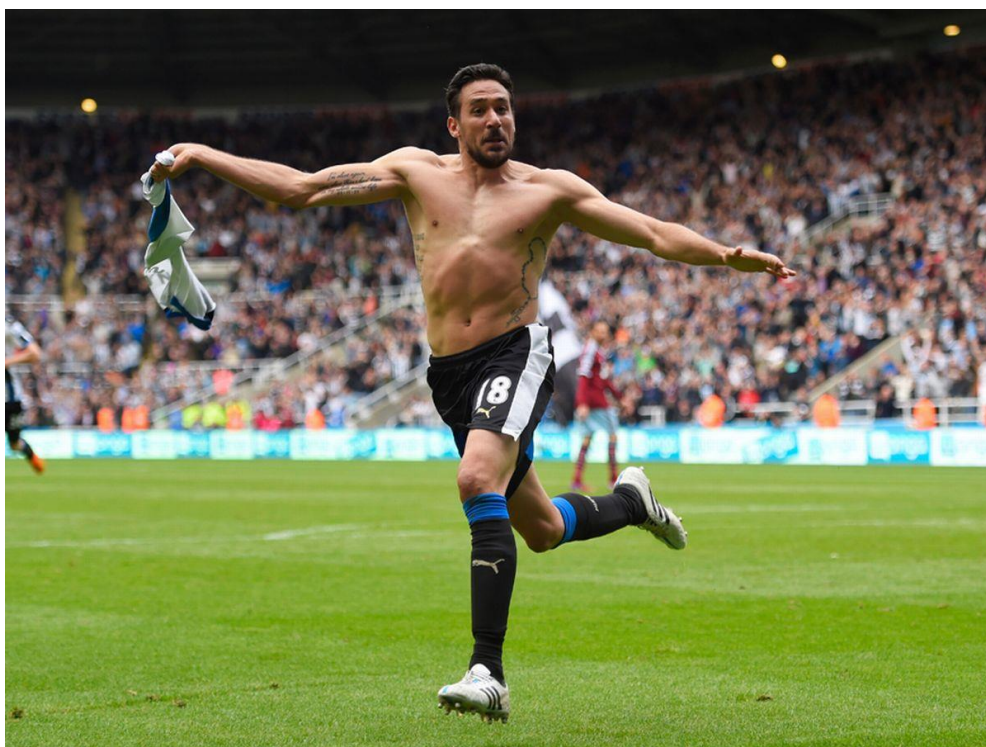
This hard supply cap, in conjunction with the blockchain technology underlying it which offers pure decentralisation, gives Bitcoin the claim to being the hardest money to have ever existed.

### Scarcity....so what?

With only 21 million of these things, it's just not possible to see a scenario that we saw in Zimbabwe in 2008, where hyperinflation caused the Zimbabwean dollar to become worthless and collapse. It's not possible to re-make the implosion of the German Papiermark. And these events are not confined to the past. Argentina's inflation rate is currently over 50% - imagine how your pension would look sitting in a bank account there?

Oh, on that topic, I have a fun fact for you: guess who had the [highest portion](#) of Bitcoin investors out of a sample I looked at recently? (and yeah...I did just plug my own piece. What you gonna do?). Here are some clues: it's a South American country beginning with A, it's currently running at over 50% inflation and a certain pony-tailed footballing [LEGEND](#) who beat cancer to come back and save his club from relegation hails from there (I hate caps lock for emphasis, but in this instance it was deserved).





*If I ever bump into Jonas Gutierrez in a pub, he won't be the one paying for pints (unless Bitcoin does end up going to zero, then he may have no choice)*

## History

See, this has been a problem for humanity throughout history. And I can hear you groan already - here goes the conspiracy theorist, claiming the dollar is going to be worthless by the end of the month. Bear with me, that's not what I'm going to say.

Let's take a trip through time and have a look at what our ancestors got up to. On this topic, I recently read "*Sapiens, A Brief History of Mankind*", by Yuval Noah Harari. I understand that it's an incredibly famous book, and recommending it is sort of like advising someone to visit the Eiffel Tower when they go to Paris, but I'm recommending it anyway. I actually did this to my old roommate recently when he went to Paris (not the shower gel thief, although this guy used to leave smelly tuna cans on the kitchen counter which is possibly worse). The Eiffel Tower is underrated, and I'm willing to die on that hill. I went there expecting to be let down, as these things rarely live up to the hype. But it genuinely is amazing, especially from the top (the Mona Lisa, on the other hand, is a waste of time – you're better off hitting up Google Images).

In *Sapiens*, Harari talks about the birth of money. He writes that the first case of money in human history was the silver shekel of Mesopotamia (a region which occupies most of present-day Iraq and Kuwait). This got me thinking, so I spent a bit of time looking into the history of money.

The first country to use paper money was China in the 7th century. In fairness, they did a reasonably good job, and it was even backed for a while by gold and silver. So, theoretically at least, you could redeem your paper money against precious metals with inherent value. But after a while, they got into a war with Mongolia, and that war was expensive. So, they got their Jerome Powell on, and hit PRINT. Soon, their money became worthless.



Let's now take a trip to France, about 1000 years later. You've probably heard of the famous economist John Law. Well Mr Law instructed King Louis XIV of France to print paper currency, because what could go wrong? Big Louis heeded the advice and, soon after, it all went to zero, with France bankrupt.

*'If you prick us, do we not bleed? If you tickle us, do we not laugh? And if you print us, shall we not debase?'* – Shakespeare's masterpiece, the Merchant of Venice, even quoted fiat currencies complaining to their rulers (central banks) about their ghastly treatment.

*\*above quote may or may not be slightly paraphrased*

How about another leap through time, this time all the way up to the 20th century (inching closer to present day now, don't you think?), when there was the German Papiermark crisis of the 1920's. Hyperinflation got so bad that notes ended up being given away to junk dealers to be recycled as paper. I mean, technically that means they never became worthless, right? Silver linings...

Next, we will travel South to Zimbabwe. 2008 - yep, not too long ago at all now - when inflation in the African country was estimated to have peaked at 79.6 billion percent month-on-month and 89.7 sextillion percent year-on-year in mid-November 2008. I'll be honest, I did a lot of maths in college, but I haven't a clue what the number *sextillion* means. But my gut feeling is that it's big, because by April 2009, Zimbabwe had stopped printing currency and announced a switch to the US dollar by the end of the year.



Yep, that's a 100 trillion dollar note from Zimbabwe

Finally, present day. As I mentioned earlier (weren't you paying attention?), I'm currently living in Colombia, which has excellent fro-yo shops (I'm writing from one right now), but on the other hand, good Greek yoghurt in supermarkets is difficult to find. But that mystery, as curious as it is, is not the reason I mention Colombia, as grave a problem as it is for me.

I mention it because last weekend, I was out with some friends and got chatting to a Venezuelan guy. Venezuela shares a border with Colombia, and there are a lot of



Venezuelans here. He spoke of how his family were forced to flee the country due to the economic crisis, along with a lot of his compatriots.

And this is genuinely true, honestly! I know the “I was chatting to a taxi driver last night” or “I overheard this in a café” type lines are normally blatantly made-up, but I genuinely did have this conversation.



*An example of an anecdote that didn't happen*

Whether you believe my anecdote or not, the scale of the inflationary damage in the country is indisputable - as of last year, an estimated 1.7 million Venezuelans were based in Colombia (roughly a third of all Venezuelan migrants in Latin America), and the government here is empathetically granting legal status to all migrants who have fled here since 2016. Starting that year, under the presidency of Hugo Chavez, the crisis has destroyed the Venezuelan economy, bringing citizens to their knees. Many of these Venezuelan refugees are homeless here in Colombia, having lost everything. Look at these inflation rates:

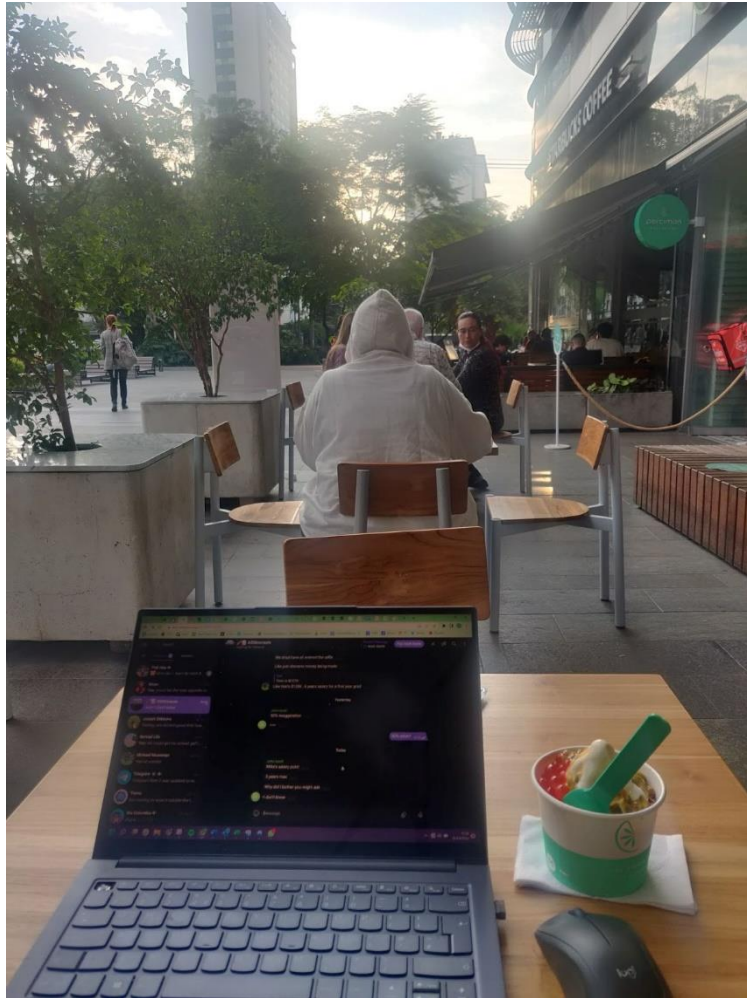
- 2015: 181%
- 2016: 800%
- 2017: 4,000%
- 2018: 1,700,000%

Estimates then become very loose, but the IMF had a bash in 2019 (they're really helping me out with this paper, aren't they?), predicting it would reach 10,000,000% by the end of the year, while the Central Bank of Venezuela's official estimate for the inflation rate between 2016 and April 2019 was 52,798,500%. What's a few million percent between friends though, am I right?

I should say, while I was telling the truth about the Venezuelan guy to the best of my knowledge, this was taking place in Spanish, a language which, well, I *cannot speak*. For example, I accidentally tried a new frozen yoghurt topping today. I tried to order passion fruit and raspberries (*maracuya y frambuesas*) but I've ended up with these weird red spherical things with liquid inside instead of the raspberries (at least I got the passion fruit part right).







*Yogur helado con maracuyá y extrañas bolas rojas*

So given my poor Spanish, maybe my Venezuelan buddy was actually talking about how inflation is overhyped, MMT is the way forward and the debt crisis is really nothing to worry about – he just came to Medellín for the perfect weather and wide array of frozen yoghurt places (the latter part is believable, to be fair).

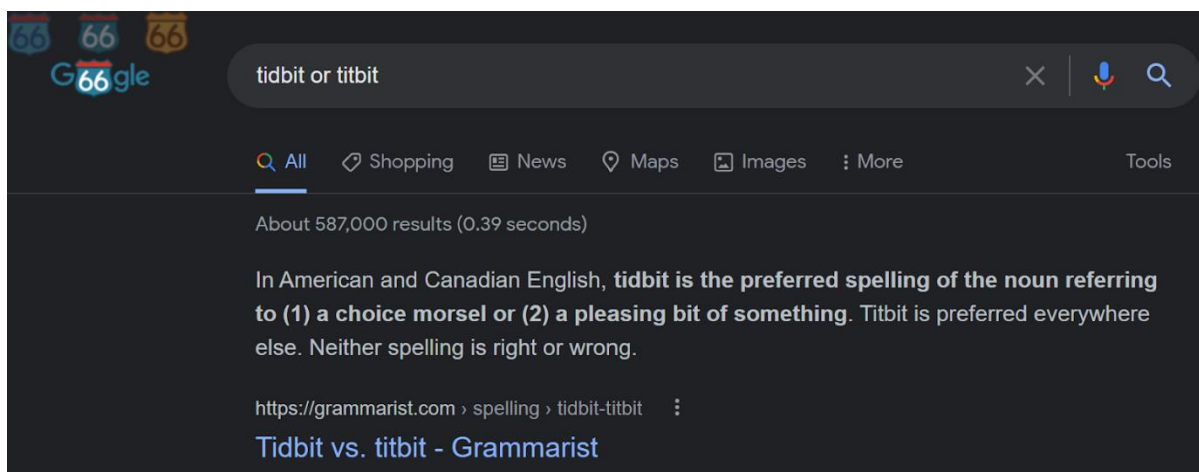
### **Is Any of That Relevant?**

Well, is any of the previous section relevant? And to be clear, I'm not talking about the frozen yoghurt chat, because that is obviously vital information for any reader. I mean the historical examples of hyperinflation, many of which are from a long time ago, when an apple was just a fruit, the term "Internet" didn't mean anything, and nobody had yet woken up and decided "*hey, I'd like to try some batsoup today. That sounds like a fun new flavour*".

Let's assess what all these currency failures mean in the context of today's monetary environment. I see the following titbit (weird word, but yes...it's in the dictionary believe it or not) floating around now and then: "*every fiat currency in human history has gone to zero*".

But actually, I don't like the "all fiat has gone to zero" stat. I think it's a textbook example of reverse survivorship bias (not sure if that's a proper term, but bear with me). The argument is only supported by all the currencies that have already gone to zero; there are still many currencies that carry value, and have done so for quite some time.





*Sorry North Americans, I don't make the rules*

Of course, proponents of this mantra will contest that, eventually, fiat currencies which are still currently valued will go to zero. But what does *eventually* even mean? These currencies are still valued now, and doesn't everything go to zero eventually? The world will *eventually* end, humans *eventually* will go the way of the dinosaurs, and Newcastle will *eventually* win a trophy.

I don't think that means anything. It's a sentence full of nothing, really. But - and this is an important point - that's not to say that history is meaningless. **Far from it** (you know it's getting serious when the Ctrl + B comes out).

Some of the tales from the previous section may not be overly relevant. One could argue, probably with merit, that the inflation episodes of King Louis, or the Chinese empire of the 7th century, are irrelevant in the context of today's monetary environment. Maybe even the Weimar Germany crisis, too.

But my point in mentioning these is to describe humanity's relationship with money, and how it often ends the same way. And even moving into modern times, we have consistently seen this exact same thing happening over and over and over again.

What we have witnessed around the world over the last decade is repeated examples of currencies significantly weakening, or even going under - just like what we have seen all throughout human history. In fact, nearly every paper currency throughout human history has gone to zero. And for the ones that currently seem to be trucking along just *fine*, are they really?

Do you remember the euro crisis of 2011-13, or are our memories that short? As someone who grew up in Ireland, I certainly remember it well, when we were part of the derogatorily (but deservedly) nicknamed **PIIGS** group - Portugal, Ireland, Italy, Greece and Spain, needing a bailout to prevent us defaulting on our debts, burning bondholders and sinking the entire euro currency - which I gave a high-level overview on in the Introduction to this paper.

You know what's funny about the PIIGS acronym (well there are a few funny things, including the fact it sparked a debate about whether it was politically correct to say. But could you not argue that having that debate at all is offensive to pigs themselves? Maybe your negative interpretation of the term is actually harmful to pigs, huh?).

But the funny thing is that Cyprus isn't included in that PIIGS group. The Cypriot crisis of 2010-2013 was particularly jarring, perhaps just that it felt closer to home for me. After coming very close to haircutting everyone's bank deposits - it was very close to confiscating \$1 for every



\$16 in citizens' accounts - the final solution was to seize 47.5% of all accounts above €100,000.

Iceland, too, is not included. Relative to the size of the country, their systemic banking collapse in 2008 was the largest in history. Their debt was 7x the time of their GDP – that's some seriously good work. And that's coming from an Irish person, so they really knocked it out of the park. Fair play.

Take a look at the below examples of hyperinflation and high inflation. Sure, some are from wayyyyy back when. But some are also very recent. And some are happening as we speak.

Hyperinflation		High Inflation	
Country	Date	Country	Date
Austria	1920's	Ancient China	3rd Century
Bolivia	1970's & 1980's	Ancient Rome	13th Century
Brazil	1990's	Iraq	1980's/1990's
France	1790's	Mexico	1970's/1980's
China	1940's	Ecuador	1990's
Germany (Weimar Republic)	1920's	Roman Egypt	3rd Century
Greece	1940's	Romania	1990's
Hungary	1940's	Moldova (Transnistria)	1990s/2000s
North Korea*	2010's	United States	1770's
Peru	1980's & 1990's	United States	1860's
Poland	1920's & 1980's		
Philippines	1940's		
Soviet Union	1920's		
Turkey	Currently		
Venezuela	Currently		
Vietnam	1980's		
Yugoslavia	1980's & 1990's		
Zimbabwe	2000's		

By the way, you'll notice several of the above cases occurred during, or shortly after, wartime. Random sidebar: the US has spent over \$8 trillion dollars on wars in Iraq, Syria, Pakistan and Afghanistan and elsewhere since 9/11, according to [this](#) Brown University study. The US spends more than the next 11 countries combined, while the study estimates interest payments on money borrowed to fund these wars could hit \$6.5 trillion by the 2050's. But this is *not* the place to be discussing the merits of military spending, so let's move swiftly on.

Is there really an argument that *today* – in May 2022 - is the day that humanity stops f\*\*king up, and avoids running currencies into the ground? That *today* is the watershed moment in monetary history?

Zimbabweans, Argentinians, Venezuelans, Turks- what do you guys think? Have us humans solved the problem? Have we quit our dirty habit?

### This Time It's Different

But while it's the exact same as it always has been - *humans don't change their stripes*, as the old saying goes - there is one thing that is, in fact, different this time. We now have an alternative to these fiat currencies. We have an option to circumvent the debt-laden system.

That alternative is called Bitcoin.

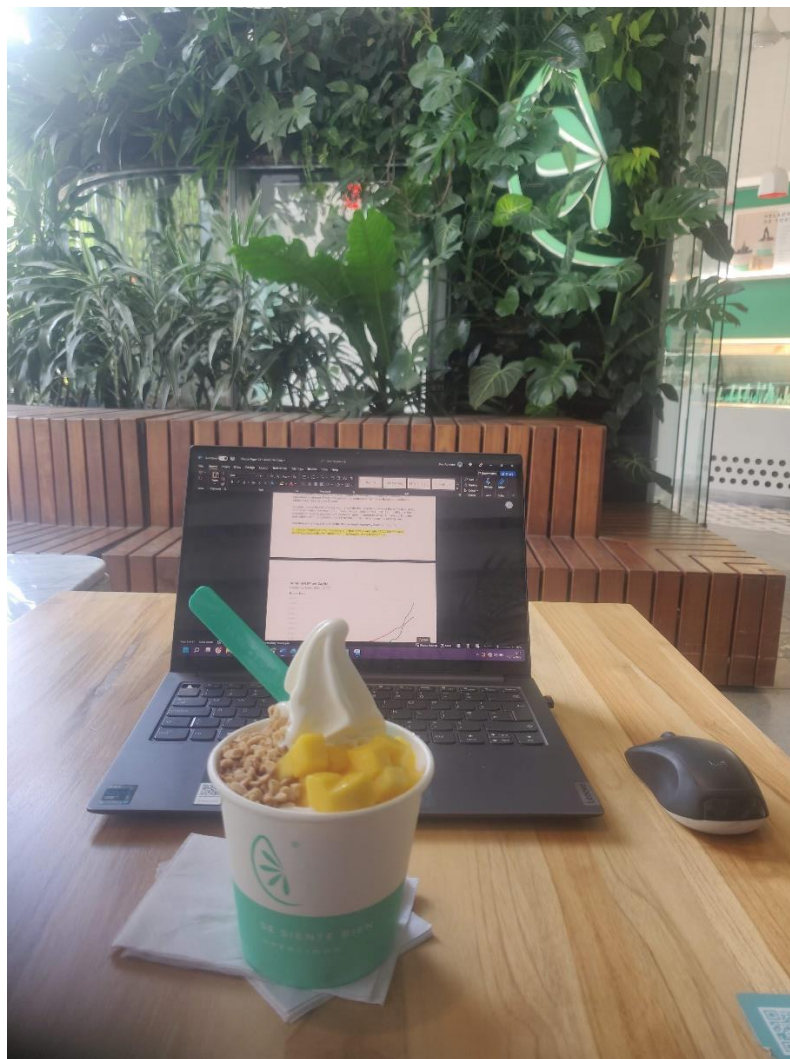
Decentralisation is a concept that did not exist until 2008, when Satoshi Nakamoto invented the blockchain in conjunction with Bitcoin. For the unfamiliar, a decentralised entity means that



the decision-making and control of that entity is transferred to a distributed network, instead of any one individual or group, such as a government, central agency, or bank.

Bitcoin can't be controlled or shut down. The code cannot be changed; Bitcoin is established in stone. *Never.* And nobody controls it – but rather, everybody does. If you're reading this on a computer right now, you can log on, download the Bitcoin network (blockchain) and start validating it yourself (mining, as it's called). But we won't get into the technicals here, as revolutionary as they are. This paper isn't about that, but rather the consequences of all this.

So, there will only ever be 21 million bitcoins, and that is an incredibly powerful fact. Throughout history, we never ever had this option. When you look at all these crises, all these failing currencies, all this paper money, the supply was always elastic. Cash that used to buy houses and cars, and now is only enough for a few KitKat Chunkys (or Chunkies? What is the plural, does anyone know somebody who works in KitKat?). It's always the same flaw – an ability to increase the money supply.



*Mango and peanuts today – hits the spot but granola retains the #1 spot*

In essence, with this section I am stating the fact (and I mean to say fact there, I could have said argument, but fact is the right word) that humankind - over and over and over again - has repeated the same thing with regards to currency failure.



All the variables from the first couple of parts of this paper could even be viewed as a sweetener. I don't use salt or garlic when I cook – I'm too lazy; I just fire everything in the frying pan. And look, it gets the job done. Could an argument be made within one paragraph, as follows, without the salt or garlic from the first two parts?

*“History has proven over thousands of years that humankind has been unable to resist devaluing its paper currencies to the point of failure. We now have one currency that physically can't be devalued. Therefore, I think that it could be worth assessing as part of a portfolio”*

It would have saved you a lot of reading time, and me a fair bit of money on *yogur helado* and *lattés con leche de almendras*, but the kicker really is the economic environment that we find ourselves in today. It tastes better with salt and garlic (I do use pepper when I cook, which is kind of annoying, because that sentence would have flowed better with pepper instead of garlic). The argument for Bitcoin grows stronger for all the reasons I discussed in those parts about the current state of the economy - debt levels, inflation, geopolitical climate, etc.

## Hedge

Bitcoin is the life raft that takes you to shore when the whole ship sinks (shout out to my podcast buddy Joetoshi Nakamoto for that analogy). And this is often where some people check out - you know, write it off as a wackjob conspiracy theory, because the whole ship is hardly going to sink. How can so many people be wrong, and a bunch of weird people on the Internet talking about this nerdy virtual money be right?

Honestly, that's a good attitude to have. I'm a cynic by heart, too, and like to play devil's advocate with these kinds of things. I find conspiracies, for the most part, ridiculous; I sometimes feel that people want to believe in them more than they actually do. One tiresome example is repeated accusations that a sports league has an agenda against a certain team, or a game was fixed, or the referee was biased.

By the way, this is also coming from a football fan who watched his country denied a chance at going to what would have been only their second World Cup in my lifetime due to Thierry Henry deciding to [play basketball](#) in the penalty area (I'm getting PTSD from just typing it).

So yeah, please don't paint me as your crackpot next door neighbour warning about the impending end of the world, shouting warnings from their bomb shelter filled with three years supply of canned food. In fact, this is sort of the best part. You don't need to believe that all these ominous things will happen for Bitcoin to carry value. You simply require *some* of it to have a *chance* of happening. And that's the kicker.

Bitcoin is a way to hedge against all these hypothetical scenarios I have described - and a lot of the episodes that we have *already* seen previously in human history. You only need to believe that there is a *chance* that the economy reaches a breaking point regarding the debt crisis or inflation.

Or you believe there is a *chance* that more countries declare it as legal tender, hoping to reduce USD dependence or get a game-theory jump on other nations. Or you believe that there is a *chance* humanity will continue to ruin its currencies, and there is a *chance* that Turkey, Argentina and Venezuela are not the final examples. Or there is a *chance* that the 2008 GFC repeats.

Bitcoin is the Armageddon hedge. It's a way to escape hyperinflation, monetary crises. A way for citizens to take charge of their own wealth, rather than put their fate in the hands of governments (wow, that sounds anarcho-liberal and explosive, but please...bear with me for



the moment). It's a way to *hedge* yourself against the flaws, stress points and overindulgence of the current system - i.e., enormous debt, rampant inflation, and foolish policy.

You only need a *chance* of these crises happening, because like most things in the investment sphere, it comes down to probability, maths and logic. I've merely looked at the economy and painted some pictures about what could theoretically happen - I haven't yet quantified the likelihood of those happening.

And hey, you don't need to sit there and point out how poorly Bitcoin has performed over X time period, or how volatile it remains, or how plainly uncorrelated with inflation it has been. I totally agree. Claiming Bitcoin comes anything close to an inflation hedge right now is like arguing Medellín isn't one of the world's best cities – it's just objectively incorrect. But that's not to say the day won't come – because the fundamentals of the asset are programmed that way, and assessing this in the context of human history, as well as the current monetary environment, throws up the intriguing *possibility* that one day we *could* see Bitcoin claim that role.

While some of you may think I'm a bit loony for all the scenarios I have written about thus far, hold off until you see what numbers I'm wrapping around them in the modelling section, and what they mean for Bitcoin as a purchase right now. You might view me as a little saner when you see the inputs to the model (I was convinced "more sane" was correct, rather than "saner", but spellcheck says otherwise). Besides, everyone thought the Titanic was unsinkable, but those lifeboats turned out to be pretty valuable.



*Right in the feels*

Oh, and by the way, there was ample room for Jack on that raft (not to mention the body warmth benefit that having a second person on the raft would have offered). Maybe Kate just wasn't that into Leo? Sometimes the truth is harsh.

But one more time - just for the people in the back - why not Bitcoin?



# Bitcoin: An Armageddon Hedge (Sort of):

## Part 4: Global Reserve Currency

This is the fourth instalment of a five-part paper, where I dig even deeper down the Bitcoin rabbit hole, to the point where you might be questioning the overall arc of the series. But I will tie it together eventually, I promise - so bear with me! It's the penultimate section before we take all this information, fire it in a model, and see what number comes out.

Parts 1, 2, and 3 were before this, and I continue on from the macro discussed there, although this can also somewhat be seen as a stand-alone instalment, so if you do have any friends, hobbies or a freshly painted wall to observe, I won't begrudge you skipping this chapter.

This part is still very much macro based, but it's a different kind of macro (fun!) - it delves into the (weird) state of the modern monetary environment and geopolitics (featuring the usual suspects - war, oil and ego-maniacs). Yeah, it's a totally happy, unified, and warm world we live in, isn't it?

Like I said before, the inspiration for this was drawn from this [paper](#) by Greg Foss, a thirty-year veteran of the credit markets. This section actually takes a break from that paper (don't worry, like a poorly scripted WWE wrestler, we all know it's coming back) and instead uses this [paper](#) published last week by the IMF, of all things (although it's a different one than the paper from the previous section). So, I'm writing a Bitcoin paper and quoting from... *another* IMF paper – the world is a funny place.

The good news is we are now halfway done. The bad news is that, mathematically, that means we still a half to go. But the most exciting part is at the end - the excel model (because excel is always fun).

- **Part 1: Macro, Macro, Macro:** An assessment of Greg Foss' paper, as well as the current state of the macro environment, the debt crisis and inflation - and what all this means for Bitcoin.
- **Part 2: Contagion:** Why I am seeing reminders of the 2008 financial crash, and what role Bitcoin can play in hedging your portfolio against the chaos.
- **Part 3: The Hedge:** An assessment of whether Bitcoin has the properties required to protect oneself against financial meltdown.
- **Part 4: Global Reserve Currency:** (You are **HERE!**) An examination into the erosion of the dollar as the global reserve currency, quoting from an IMF [paper](#) released last month, and analysing whether Bitcoin could step up to fill the void.
- **Part 5: Bitcoin Pricing Model:** The fun part! Left to the end, I tie everything together and put a number on Bitcoin.



## Part 4: Global Reserve Currency

Following on from the macro discussed in Parts 1 and 2, we have another possible scenario which could throw the whole thing into disarray, and that is the status of the dollar as the world's reserve currency. Let's first take a walk down memory lane.

### Bretton-Woods Agreement

1971 is where this all starts. That was the year that US President Richard Nixon gave [this speech](#), where he announced that he had "*directed the Secretary of the Treasury to take the action necessary to defend the dollar against the (international) speculators*". His method here was "*to suspend **temporarily** the convertibility of the dollar into gold or other reserve assets*". And just like that, the [Bretton-Woods](#) agreement, in place since 1944 and requiring the USD to be backed by gold, was gone.

Btw - notice the word "temporarily" in his quote? Well, Richard, here I am in 2022 and I still can't redeem my USD for gold bars. Which reminds me of a certain discussion we had back in Part 1 about "transient" inflation - if "temporary" means 51 years (and counting) from 1971, does that mean the "transient" inflation of the last two years still has 49 more years to run? Or is "transient" briefer than "temporary"? I need a dictionary.

But I digress (what's new?). The US dollar, despite Nixon's speech, has remained as the world's reserve currency ever since. This IMF [paper](#) published last month discusses how, in reality, the world didn't really have many alternatives (yes! Another IMF paper! I promise I'm not an IMF spy here to kill Bitcoin).

China was not yet a superpower, so that ruled out the renminbi; euros also didn't exist yet. Although it doesn't mention Bitcoin (hint: more on that later), this was also well before Satoshi's time. So, the world didn't really have a choice, and the dollar remained as it was - our global reserve currency.

### The Times They Are A-Changin'

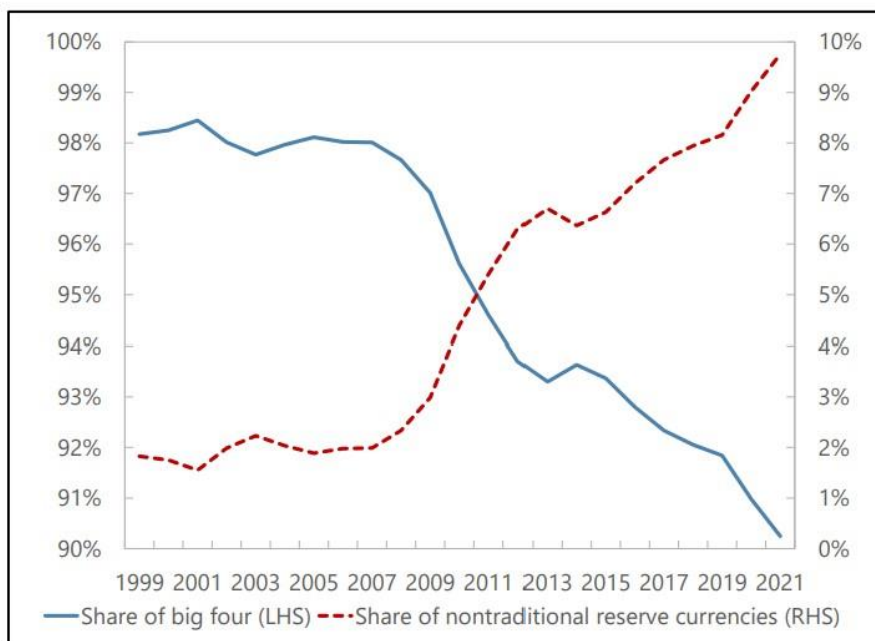
Bob Dylan once sang "*you better start swimming or you'll sink like a stone, for the times they are a-changin'*". Now, music is open to interpretation, but my understanding of these lyrics is that it was a warning to the Federal Reserve regarding the dollar's status as the world's reserve currency.

Let's look at what has happened to USD over the last couple decades:





## Official Reserve Shares of “Big Four” Currencies vs. Nontraditional Currencies



Source: IMF Currency Composition of Official Foreign Exchange Reserves (COFER).

Note: The “big four” currencies are the US dollar, the euro, the Japanese yen, and the British pound.

That’s USD reserves on Central Bank balance sheets, which have fallen to 59%, from 71% at the turn of the millennium. In fact, this is from that same IMF [paper](#) I mentioned, published a couple of weeks ago on the erosion of the US dollar (if you think I’m a delusional lunatic just typing nonsense on the Internet, you can at least listen to the IMF, right?). It assesses the composition of reserves held by Central Banks, which they use as a proxy to measure what the world’s reserve currency is (USD), as well as the strength of that position.

What the graph also shows, however, is that the composition of the other major currencies has been mostly stagnant. Instead, the paper notes that *“the decline in the dollar’s share has been matched by a rise in the share of what we refer to as non-traditional reserve currencies, defined as currencies other than the US dollar, euro, Japanese yen and British pound sterling”*. And again, just like earlier, I added the hyphen in “non-traditional” to the original IMF quote there. @IMF, is there no room in the budget for a Grammarly subscription? (Oh, and I’m well aware of the irony of an Irish person lambasting the IMF for having no room in the budget. If it wasn’t for little old Ireland [in 2010](#), they’d have €22.5 billion more in their coffers and their grammar would be clean as a whistle, as you’ll know if you read the Intro to this paper).

With no significant accumulation of those mentioned currencies – US dollar, euro, Japanese yen and British pound - commonly referred to as the Big 4 (although China have kind of done a Manchester City on it and turned it into a big 5), the IMF say Central Banks have diversified into other alternative assets.

*“As shown in Figure 1, the share of non-traditional reserve currencies rose from negligible levels at the turn of the century to roughly \$1.2 trillion and 10 percent of total identified reserves in 2021”*.

A quarter of this shift has been into the Chinese renminbi, whilst the remaining 75 percent has been towards other non-traditional reserve currencies. So, the paper pretty much says that



the USD's position as the global reserve currency has fallen, but no other currency has filled the void. Sort of like that lull period in golf around 2008-2010 that was post-Tiger Woods, but before the new, younger generation of the McIlroys, Spieths, Dustin Johnsons et al. When you had guys like Lucas Glover, Graeme McDowell and - dare I say it as a proud Irish citizen - Padraig Harrington winning the majors.

The IMF theorises that the reason for the fall in USD is three-fold. First is the growing liquidity of markets in other currencies. Previously, you often had to trade currency A into USD before trading USD for currency B - it is now easier to trade currency A to currency B directly, hence removing the need for USD.



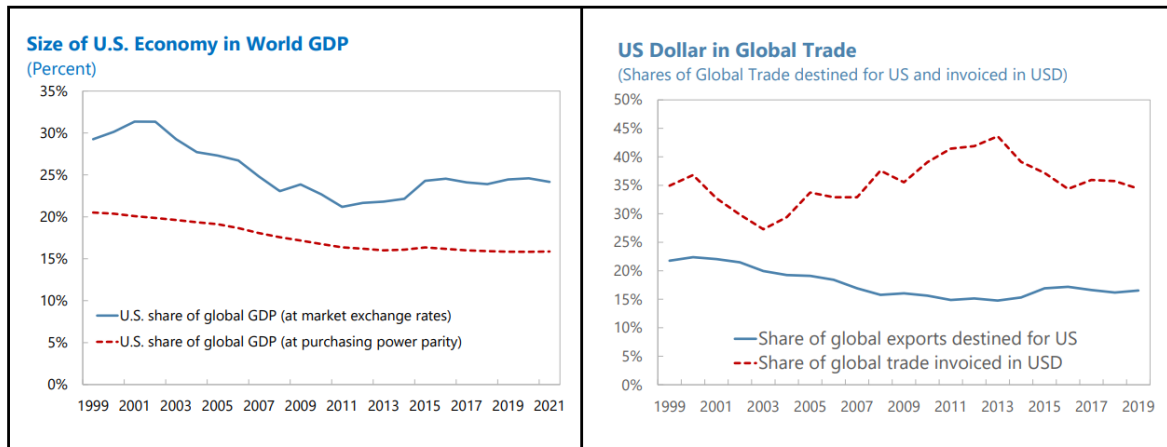
*Watermelon is actually surprisingly bland*

Secondly, reserve managers have become “*more active in chasing returns. Central Banks have accumulated substantial portfolios of financial assets. The larger the portfolio, the more scope there is for financial gains (and also, to be sure, losses) from active reserve management*”.



And finally, although this is pretty much the same reason as number two (@IMF, were you guys trying to hit a word count or something?), the yields on top-tier sovereign bonds have fallen toward zero, forcing Central Bank reserve managers to pursue higher yielding alternatives.

But whatever the reason, the reserves are falling. Furthermore, the size of the USA's share of the global economy has shrunk, as has their slice of global trade.



Sources: Boz et al. (2020), IMF International Financial Statistics, IMF World Economic Outlook.  
 Note: The share of the US dollar in global trade is based on calculations using the Boz et al. (2020) dataset and the IMF's International Financial Statistics.

### What This Means

So, where am I going with this? Well, someone I know does this disgusting thing where she Googles the end of the movie before watching it (when I struggle to believe that protagonists in Netflix true-crime docs can be as psychotic in real life as they are portrayed on-screen, I think of people like her and then I realise it's very feasible).

But anyhow, I don't want this turning into an IMF review session, so I'm going to take a leaf out of "her" book and jump to the last sentence of the paper (note I deliberately referred to "her" as vaguely as possible as "someone I know", because I really don't want it on public record that I associate with these kind of people, for the inevitable day that Netflix comes calling to interview me for the latest true crime documentary about a body that was found in her garden).

So anyway, the IMF concludes their paper by saying *"all this suggests that if dollar dominance comes to an end (a scenario, not a prediction), then the greenback could be felled not by the dollar's main rivals but by a broad group of alternative currencies"*.

OK. So, we have the IMF acknowledging that the stalwart dollar is weakening as a reserve currency, but none of the young guns are stepping up. So, how about Bitcoin becoming one of these reserve currencies?

### Bitcoin

Well, I gave the paper the read, as well as double-checking via the old University "Ctrl + F" special and the word "Bitcoin" appears exactly zero times in the 42-page paper. Which if you ask me, is a little *meh* when writing a paper about the weakening of the dollar.

At least explicitly call out Bitcoin as *not* the answer, rather than ignoring it completely. Can you imagine writing a 42-page paper, concluding that USD is getting eroded as the global currency,



and not even mentioning Bitcoin? If you're a movie fan, it's the most egregious snub since *The Shining* got zero Oscar nominations in 1980, despite being widely considered as one of the best horror movies ever.



The below are proportions of the currencies which the IMF reports that Central Banks have rotated into, in place of their lower USD holdings:

- Chinese Renminbi - 25%
- Canadian Dollar - 23%
- Australian Dollar - 20%
- Korean Won - 8%
- Swedish Krona - 6%
- Singapore Dollar - 5%
- Norwegian Krona - 5%
- Other (Fiat) Currencies - 8%

And if anyone is a big enough loser and calculates the above as 99%, yeah I know - it's because of rounding. Either way, take your complaints to the IMF, they wrote the paper, not me (while you're at it, ask them about why their "aid" [policies](#) are doing the exact opposite of helping, you can tell them a boy on the Internet writing about crypto sent you and I'm sure they will be very open-minded about it).

But back on point. Possibly the most interesting part about this paper is the fact that the IMF is even writing it in the first place. And regarding their closing quote that I mentioned above, the mere fact they have to clarify that their examination of dollar dominance coming to an end as a "scenario, not a prediction" is telling enough in itself.

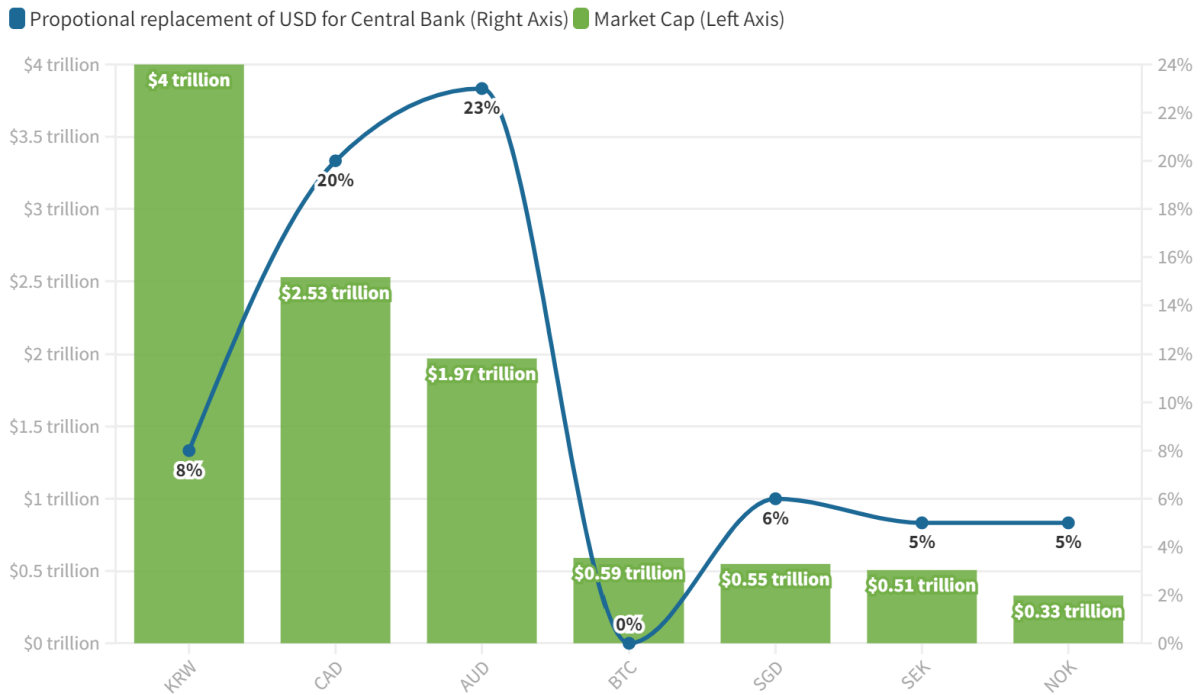
Bitcoin's market cap has also been at the point where it can compete with other currencies - it's currently worth \$400 billion, whilst CAD and AUD, who the IMF list above as the second and third most popular currencies getting bought up by Central Banks, are \$2 trillion and \$2.5 trillion respectively (formerly Bitcoin was \$1.3 trillion, RIP).



I have presented Bitcoin below in comparison to the other currencies into which Central Banks have rotated. It shows that in terms of market cap, Bitcoin very much fits in with the crowd (I have removed the Chinese Renminbi for scale purposes - 25% of the reduced USD holdings on Central Bank accounts have flowed into Renminbi).

### Movement of Central Bank into Non-Traditional Currencies (1999-2021)

Excluding Chinese Yuan (\$39 trillion MC, 25%)



@DanniiAshmore

Two of the reasons the IMF declare as drivers behind the increased holdings of non-traditional currencies on Central Bank balance sheets - the desire to move out on the risk curve and generate greater returns (again, I'm confused as to how the IMF separated these into two reasons, and my only theory remains that they were trying to hit a word count) - are certainly features which Bitcoin offers.

The final reason - increased liquidity and availability of cross-exchange with the FX market - won't be a problem either; Bitcoin is central to liquidity within the crypto markets, and many FX markets are already available via tokenised platforms, and will likely be available in mainstream markets (if they aren't already) soon, if Bitcoin continues to grow.

Throw in the immunity to sanctions that the decentralisation of the blockchain offers, enabling states to remove their vulnerability to a potential freezing of assets similar to what we have seen levelled on Russia (\$630 million of foreign reserves locked), and Bitcoin ticks a lot of boxes.

So again, why not Bitcoin?

Sometimes, just sometimes (and call me crazy here if you want!), I get the feeling that the IMF [is not the biggest fan](#) of cryptocurrency.



## Oil & Saudi Arabia

Right, we won't get too contentious; let's move on to a couple of wholesome, non-controversial, happy-happy topics to change it up: oil, Saudi Arabia and good old geopolitics in this warm and peaceful world we live in.

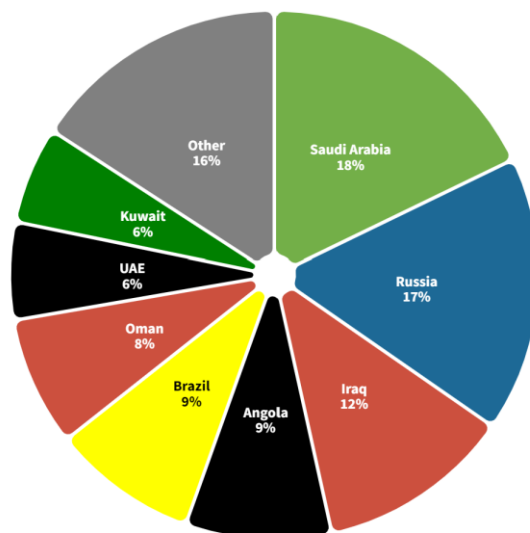
Recent talks between Saudi Arabia and China to price oil contracts in yuan rather than dollar could have seismic consequences, and greatly undermine the status of the dollar (btw, no hits for "oil" when I Ctrl + F the IMF paper either. There are 7 hits for "error" however, just for the record). While these talks have been on and off for a long while, they appear more threatening this year due to the tension that has crept into the Saudi/US relationship.

After China and Saudi Arabia saw how the US so greatly weaponised the dollar against Russia (restraining them from selling foreign assets to support the ruble and combat the economic sanctions), they must realise how vulnerable they would be in the same situation. The Russian ruble was down 33% at one point in March, wiping out millions upon millions of savings for Russian citizens. Bitcoin, meanwhile, actually hit an all-time high in Russian rubles. While the ruble has rebounded since (via some very inorganic manipulation by Putin), it highlights the vulnerability to holding dollars.

Saudi Arabia has sold oil denominated in dollars since an agreement struck with the Nixon (that guy really loved the dollar, didn't he?) administration in 1974, and this petrodollar has been vital to the establishment of the US dollar as the global reserve currency.

Given all this, I decided to look into Saudi Arabia's oil exports and see what kind of fallout we could be dealing with should they flip to yuan-denominated contracts. It turns out that 25% of Saudi Arabia's oil goes to China, meaning a move to yuan would indeed be a huge blow to the dollar.

**China's Top 15 Providers of Crude Oil**  
Top 15 Countries Supply 90% of China's Oil



@DanniiAshmore

*Picasso never made pie-charts, but if he did, he would probably respect me attempting to sort-of co-ordinate the colours of the above slices to the national colours of the respective countries, even if the garish result does give me a bit of a headache, figures via worldstopexports.com*



Remember, China is the largest holder of US treasuries and so will be eager to diversify this exposure in light of recent geopolitical events. How do you think the Chinese government is feeling right now, with all those US treasuries on their balance sheet, after what the US did to Russia?

If they elect to sell the Treasuries (which the Fed have been wiping up at an alarming rate over the last two years) and Saudi agree to launch the yuan-contracts, US will take a huge hit as the petrodollar dominance wavers. What do the US do then, in order to repay the debt? Well, there's kind of only one answer - **print more money**. Again, it's a never-ending merry-go-round of fiat debasement. The debt spirals.



*Coffee I just ordered – I'm taking this as a sign from the Universe that a black swan event is imminent and the US dollar is going to zero, Bitcoin is going to \$100K and Colombia is winning the World Cup this year (update: Colombia lost last night and so have failed to even qualify for the tournament. USD to the moon!)*

Now that we have spoken about Saudi Arabia and China considering giving the middle finger to the US and establishing yuan-denominated oil contracts, I noticed something else when I put together the above masterpiece of a pie chart displaying the source of China's oil imports. Look who comes in second – Russia. Do you think they would be open oil contracts in a non-dollar denominated currency? Or nah, maybe Putin would prefer to just head home, kick his feet up and watch some Netflix - he's a chill guy.



Well, surprise surprise, Russia is supposedly [considering](#) Bitcoin for its oil and gas contracts. So, while you feel pricing energy in Bitcoin may be far off right now, and we are merely talking hypotheticals here - it's an interesting point to ponder. As the geopolitical climate continues to deteriorate, sanction-free Bitcoin definitely provides a unique and neutral option for energy contracts.

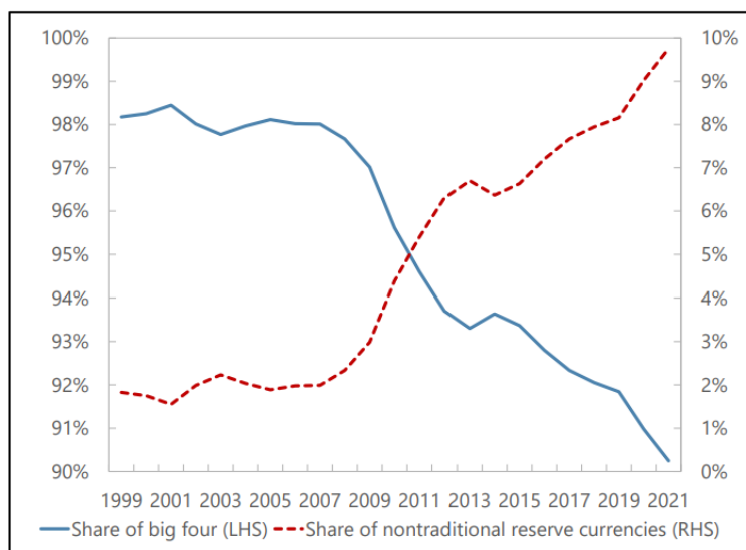
*Update:* Russia, China and other BRICS countries are primed to develop a new global reserve currency in a challenge to the US dollar, it was reported [this week](#).

If other states follow the enigmatic El Salvador in declaring Bitcoin legal tender, the likelihood of Bitcoin elbowing in on the non-traditional currencies mentioned above increases further. And if it does indeed become the unit of trade for countries regarding energy? Then, my dear Central Banks, you gotta hold it - you ain't got no choice.

## The Numbers

So, I've made my point as to why Bitcoin has a case, at the very least, to be included in this alternative basket of currencies that are wrestling market share from the dollar. Take a look at the below graph from then IMF paper for a second, specifically that red line which represents the holdings of non-traditional currencies (if you have a problem with the axis-crime, again please direct your complaints to the IMF, who created the graph).

Official Reserve Shares of "Big Four" Currencies vs. Nontraditional Currencies



Source: IMF Currency Composition of Official Foreign Exchange Reserves (COFER).

Note: The "big four" currencies are the US dollar, the euro, the Japanese yen, and the British pound.

What the graph shows is that global holdings of non-traditional reserve currencies have risen from \$30 billion in 1999 to \$1.2 trillion just over twenty years later. That represents a 40X increase.

Translating this 40X increase to Bitcoin, from the 1st January 2021 price, means a market cap of \$27 trillion in 22 years. Which means that in 2043, we could see a \$1.3 million price per bitcoin.





<i>Non Traditional Currency on Central Bank Balance Sheets</i>	
1999	\$ 1,200,000,000,000
2021	\$ 30,000,000,000
Multiplier	40X
<b>Fair Price</b>	<b>\$ 1,285,091</b>
<b>Market Cap</b>	<b>\$ 26,986,906,800,000</b>
<b>% Return</b>	<b>6329%</b>

Now, there are a LOT of assumptions here. Which is why I won't give the above scenario much weight in my final model (which I'll get to in one of the later sections). But ye, here's a sneak little preview of what is in store in Part 4 - putting a number on Bitcoin's fair value (just not THAT number).

After all, models are made to be broken, despite me sitting here wasting away my Wednesday evening building one. Nonetheless, it does represent a possible scenario which I believe there is a non-zero chance of happening.

And sure, there are a lot of assumptions and theories which may seem far-fetched in this section. However, let us stay balanced here - the monetary climate is different today than it was twenty years ago. And never had we had so many push factors away from the USD, as we discussed above (were you listening, or did you skip to here?). So, it's a scenario worth mentioning, at least.

But like I said, it's just a hypothetical low-likelihood scenario that won't carry much weight in my model in the next chapter.

## Conclusion

With the US dollar's grip as the world's reserve currency loosening - even before accounting for the potential oil-based catalysts and other geopolitical factors above - there is an opportunity for other currencies to fill the void, and that's even according to the IMF.

So why can't Bitcoin join the party? If we are talking a global reserve currency, it is the hardest, more secure and impenetrable currency available. Two countries have already declared it legal tender (El Salvador & Central African Republic) while it's on a few companies' balance sheets (Tesla, MicroStrategy) - and it's barely a decade old.

The only trust Bitcoin requires is in maths (or math, without the S, for you North Americans out there). You don't need to have faith in Jerome Powell, Joe Biden or Elon Musk - in fact, you are required to trust precisely zero old, wealthy, white guys for Bitcoin to function. Just *math*.

It's expanding at a meteoric pace, with adoption ramping up. And while any run towards being part of this ascending basket of alternative reserve currencies may seem remote, it doesn't have to be that likely for this to be a good investment - but more on that in a later part.



And regardless, the main point here is that if the dollar continues to lose its appeal, the only way out will be for Jerome to click GO on his money printer. So even if you believe that the possibility of Bitcoin moving towards reserve currency status is complete codswallop (my Mum uses that word and I think it might be Irish slang, but I'm not sure; if so, it pretty much means nonsense), it will still be well placed by virtue of the fiat printing to escape the dangerous cocktail of rapidly-expanding debt and a weakening USD.

What's more, it has arrived fresh off the back of governments around the world making a mess of monetary policy, running up a bill like they're a nine-year-old kid who has been left alone in a hotel room with one of those mini fridges filled with Coke, cookies and chocolate.

So, one more part to go, and it's the fun one. Let's put a price on this weird Internet money, and finally extract something of substance out of these jumbly thoughts. Who likes probability?



# Bitcoin: An Armageddon Hedge (Sort of):

## Part 5: Bitcoin Pricing Model

EVENTUALLY, this is the final instalment of a five-part series in which, to sum it up as accurately as possible, I dove way down the Bitcoin rabbit hole - but now I'm nearly out the other side.

Part 1 and Part 2 are pre-requisites for this part, as it uses the analysis discussed there (on the credit market and macroeconomic environment) as inputs in the pricing model below. Part 4 is a bit more of a lone wolf, so you could probably get away with giving that the miss if you just want to jump into the pricing model below (to be honest, if you read all four parts and are still here, I'd be worried if you weren't sick of me by now). Part 3 gives a lot of the reasoning as to why Bitcoin but isn't a direct pre-requisite for the numbers here.

In this final chapter, I draw to a close the analysis on Bitcoin in the context of the wider macro environment, using what we have discussed to date in creating a model, inspired by this tremendous Greg Foss [paper](#), with adjustments as discussed, to calculate the intrinsic value of Bitcoin. I put probabilities around all the scenarios we discussed, and see what number pops out.

Contents of the paper are as follows:

- **Part 1: Macro, Macro, Macro:** An assessment of Greg Foss' paper, as well as the current state of the macro environment, the debt crisis and inflation - and what all this means for Bitcoin.
- **Part 2: Contagion:** Why I am seeing reminders of the 2008 financial crash, and what role Bitcoin can play in hedging your portfolio against the chaos.
- **Part 3: The Hedge:** An assessment of whether Bitcoin has the properties required to protect oneself against financial meltdown.
- **Part 4: Global Reserve Currency:** An examination into the erosion of the dollar as the global reserve currency, quoting from an IMF [paper](#) released last month, and analysing whether Bitcoin could step up to fill the void.
- **Part 5: Bitcoin Pricing Model:** (You are **HERE!**) The fun part! Congratulations on reaching the promised land.

The goal of these articles is to assess Bitcoin's place amid the macro environment, using the 2008 financial crash and human monetary history to guide us, and to calculate its intrinsic value and potential place in your investment portfolio.

OK, OK, OK, the music is playing and I need to get off the stage. So, let's \*finally\* wrap this up and calculate what this odd, make-believe "currency" is actually worth.

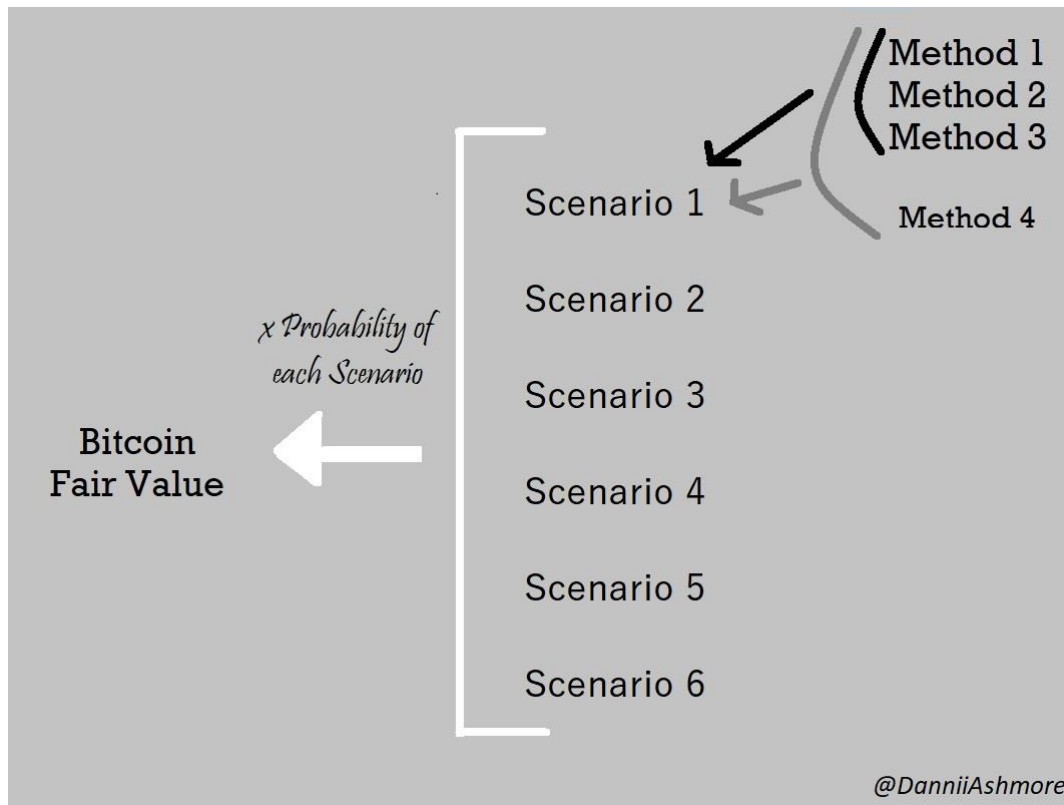


## Part 5: Bitcoin Pricing Model

### Valuation Models

It's numbers time.

I'm going to take a few different scenarios here, before throwing them all into a model to calculate the fair price of Bitcoin. I put my Picasso hat on again to demonstrate this visually before we get started:



*Each scenario's price will be multiplied by the probability of that scenario coming true, to generate an expected value for Bitcoin*

Let's first dive into Foss' attempts, as this was what inspired me to write this paper in the first place. He took a novel method to put a number on Bitcoin, calling it the Fulcrum Index.

### Hedging the World's Fiat Debt (Scenario 1)

The spirit for scenario 1 is largely derived from the Fulcrum Index approach in his paper, although I have modelled it in a different way. As we outlined in part 4, Bitcoin can be seen as an escape route from the fiat system, in order to hedge against the debt crisis we discussed in part 1. Therefore, we will equate Bitcoin's fair value to the cost of insurance on the worldwide debt, as specified by the sovereign CDS market.

This part does get a little denser, especially as I have attacked the calc via four different methods before taking an average, but I'll try to explain it as simply as I can. If you don't really care about the underlying method, feel free to skip to the latter half of this chapter.

Let's get to it. There are three main steps:



- Calculate the value of all global debt obligations
- Calculate the spread (as defined by the CDS market) on that debt – i.e. what it costs to insure the debt, or how likely it is for a default to occur
- If Bitcoin is a hedge for the fiat debt, then it follows that Bitcoin’s value should equal this cost of insurance on the debt in the CDS market.

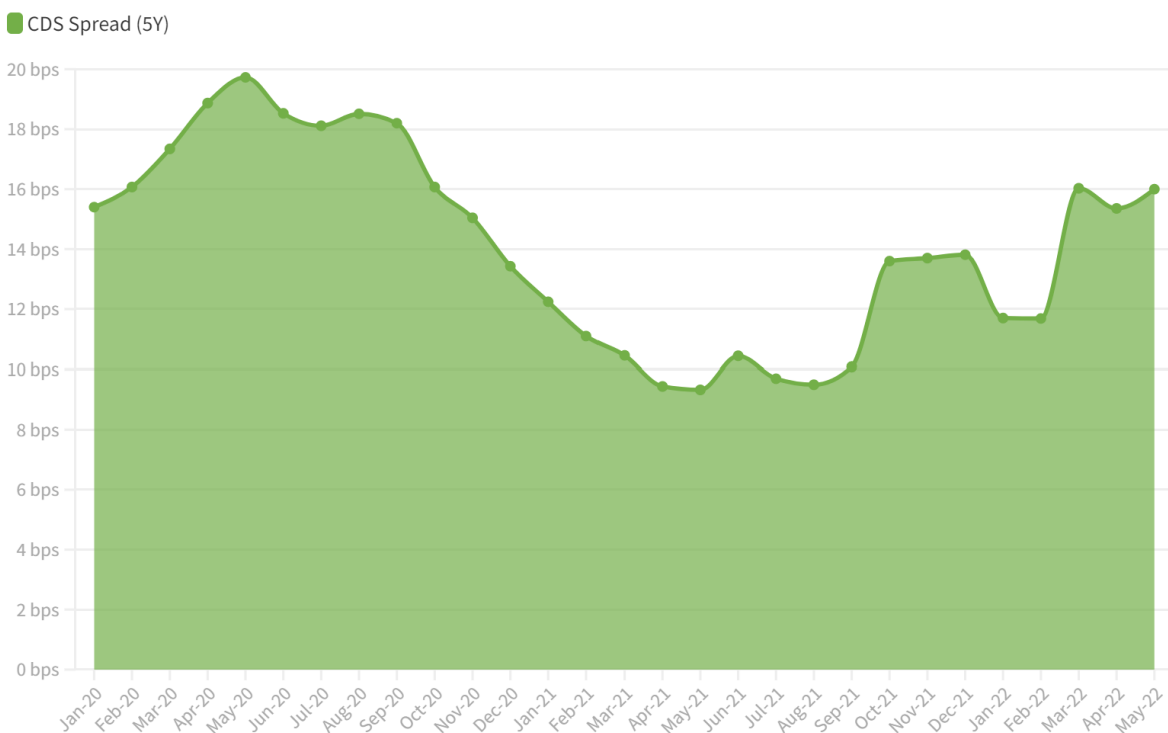
To keep things simple, let’s first put our focus solely on the US, rather than the world (like how the SuperBowl champions are referred to in American media as “World Champions” – it’s the same thing, right?).

Currently, there is about \$30.4 trillion of US sovereign debt (the debt clock I visited with a picture in Chapter 1 has \$31.5 trillion, but we will go with the conservative figure). But there is also \$169 trillion of unfunded liabilities that this figure doesn’t catch. This is predominantly social security and Medicare – if you want a full breakdown, you should take a visit to the scariest website on the Internet: [usdebtclock.org](http://usdebtclock.org) (warning, website is NSFW).

Some context, because these figures are *muy grandé*. That’s a liability of over half a million dollars per citizen. My favourite fact, however, was one I computed myself by visiting the website with my stopwatch: by the time you finish reading this sentence, assuming you read at the pace of an average adult, debt in the US will have increased by \$1.175 million. Perhaps you can argue that phrase should have been split into two sentences, but hey – I never trained as a pro writer, take your grammar concerns elsewhere.

This brings us to \$199 trillion of total obligations for the US. Looking at CDS spreads - which as we know are insurance on debt payments - the spread on US sovereign bonds is 16.0 bps for a 5Y CDS (for the uninitiated, bps stands for basis points, which are just one hundredths of a percent. So, 100 bps = 1% or, in this case, 16bps = 0.16%).

### US 5Y CDS Spread



@DanniiAshmore

USD 5Y CDS spread since Jan-20



But using a 5Y spread is too short – Medicare and social security have a durations significantly longer than that, and we want to match the duration of the assets to the liabilities. Foss says that a 15Y spread would be more reasonable. I'd probably lean on the side of a 20Y being a closer duration match for these liabilities, but in the interests of conservatism, let's retain 15Y. In my previous job as a (trad-fi) pricing analyst, my boss always preferred that I err on the side of caution in my models, advice which I think was very prudent and a practice which I'd like to continue (thanks, James!).

Besides, that job was in aviation finance, and what's the difference between airplanes and Bitcoin? They'll both one day take us to the moon, am I right?

I played around with how to extrapolate the implied spread to 15Y. I wasn't too comfortable using a standard bond tenor calculation. However, the data on CDS contracts is really challenging to find, so I eventually gave up and came to the solution that a crude extrapolation was as best I could do. Trust me, I spent a full afternoon trawling the Internet while guzzling down smoothies, but all I ended up with for my troubles was the realisation that papaya, despite apparently being very similar to mango, is nowhere near as good in a smoothie.

In the end, I actually just multiplied by 3, which hurts my soul a little bit, but it was the best I could do without dropping thousands of dollars on a data subscription that mightn't even have the 15Y spread at all. If someone wants to donate a thousand dollars, be my guest, and we can narrow that spread down a decimal place or two (please don't. You're better off saving the money and starting a Greek yoghurt place in Medellín, it would give me, as well as the world at large, much more happiness). This is gross assumption *numero uno*, however.



*Currently, it's a Top 3 consisting of maracuyá, mango, arándanos for the fruit toppings. Looks like explosión fresa are those weird balls I got above in part 3! What a total fraud they are.*



Remember, to explain the basics here: the wider a spread, the likelier a default is - so 15 years will be wider than 5 years because there is obviously a higher chance of default over a long period. With 5Y spread coming in at 16 bps for the USA, 48 bps is what I'm assuming the 15Y is.

We can interpret this 48 bps (i.e. the spread of a 15Y CDS on US government debt), as the market-defined price of insurance on the \$199 trillion of debt obligations that the US government has. So akin to how we mentioned in part 1 that it cost \$9K to insure \$10 million of defaults on Lehman back in 2008, here it would cost  $0.0048 * \$193 \text{ trillion} = \$926 \text{ billion}$  to insure the \$193 trillion of debt.

But what if, instead of CDS, we use Bitcoin to hedge these liabilities? If Bitcoin is to be seen as insurance on this fiat debt, it follows that a fair market-defined price would be  $48 \text{ bps} * \$193 \text{ trillion} = \$926 \text{ billion}$ . And, dividing by 21 million bitcoins, that lands at a fair market value of **\$44,000** per bitcoin.

## Worldwide

Bitcoin has hit that valuation before, so has the market been correct? Well, no. If the US fails, we get to reunite with our old friend again - contagion. Besides, there is no logic to using the US alone; I just did that to keep the illustration simple. If we are viewing Bitcoin as a fiat hedge, we clearly need to include worldwide debt.

This is where the modelling gets a bit trickier, but I'll try keep it as simple as I can. If you're still awake by now, that's a good sign. I was actually considering naming this section Melatonin, because I was afraid it would put everyone to sleep.

If we had all the CDS spreads, and all the debt for every country in the world, this model would be easy from here. We would simply multiply each country's CDS spread by that country's debt and sum up all the results to calculate the total insurance value - and by the logic we are following, this would equate to the theoretical fair market cap of Bitcoin.

As I've learned when building models, unfortunately, is that life is rarely that easy. This data does not exist - the CDS market is not really the most liquid or public. We only have 5Y spreads, and we only have them for a small subset of countries. What's more, I couldn't even get the breakdown of world debt for countries - never mind the CDS spread on that debt.

### *Method 1*

The first method which sprung to mind was the easiest (and laziest). The number to insure US debt comes to \$926 billion, as calculated above. US debt comprises 9.63% of worldwide debt, per latest IMF figures - so assuming this \$926 billion is 9.63% of the insurance on world debt, we come to a total value of \$9.2 trillion to insure the world's debt. Dividing that by 21 million coins gives us a fair value for Bitcoin of **\$458,000**.

Do you remember what the estimated number for inflation in Zimbabwe last decade was? It was something sextillion, right? Well, that's roughly the number of assumptions that went into the above \$909 billion calculation. In less elegant terms, it's total bullshit. Let's move on.

### *Method 2*

We, again, have our number for insurance on US debt at \$926 billion. Removing the US portion of \$30 trillion from the total global figure of \$296 trillion leaves us at \$266 trillion.



I then downloaded all the credit ratings per Standard & Poors from <https://countryeconomy.com/ratings>. Running an analysis of the weighted distribution of worldwide debt and each country's credit rating, I calculated the weighted rating to be A. Looking at the 5Y spreads per [worldgovernmentbonds.com](http://worldgovernmentbonds.com), the 5Y spread corresponding to this rating is circa 20 bps, which extrapolating to 15Y equates to 61 bps.

So  $(0.61\% \times \$266 \text{ trillion}) + (\text{US insured amount of } \$926 \text{ billion}) = \$3.2 \text{ trillion}$ . That means a price per bitcoin of **\$121,000**.

But hold on, while not Zimbabwe-inflation levels of assumptions, there are a lot of questionable moves here (maybe Argentinian inflation numbers?). Oh, and this doesn't include Russia by the way, as their CDS spreads have gone bananas (any theories why?). But given they have relatively small debt of \$290 billion, it doesn't move the dial too much - just a little extra conservatism, because why not?

### *Method 3*

So this is the same as Method 2, except instead of calculating the average world debt rating as A, I take the 5Y CDS spreads of the 25 countries I do have (excluding Russia for obvious reasons, and USA because I have already dealt with them above), and calculate a debt-weighted average 5Y CDS spread. This comes out to 30 bps, which is 89 bps extrapolated to a 15Y duration.

Multiplying the \$265 trillion of non-US and Russian world debt by this 89 bps calculates \$2.4 trillion for the cost of insurance. Adding on the USA insurance cost of \$926 billion brings us to a total global value of \$3.2 trillion. Divided by 21 million bitcoins, that is **\$156,000** per coin.

This feels like a more accurate method than the previous two approaches.

### *Method 4*

The final method takes all the debt listed on the [World Debt Clock](http://WorldDebtClock) website – which is \$85 trillion (it is largely made up of developed economies). It then simply takes the CDS spread of each and multiplies by each country's debt (for the countries where the CDS data is not available, I have assumed it equivalent to other countries with the same S&P ratings, or interpolated between S&P ratings if no country with the same rating).

Because we are not dealing with the total amount of global debt, it calculates a lower value of \$1.9 trillion, although the conservatism baked in could probably be argued for, given the fact that as countries become less credit worthy, their CDS spreads and consequent insurance amounts are less trustworthy. The value per bitcoin spewed out is **\$92,000**.

## **End Result**

So, nothing like some finger in the air number crunching, huh? If you happen to be in an airport right now with a 10-hour layover, I'd suggest playing a "count the assumptions" game from the previous section, as that will kill some serious time.

But let's be clear here. If Bitcoin does provide that virtual raft from what could be a sinking fiat ship, like we discussed in Part 3, the numbers here show us that there is a staggering amount of value in the asset, if only the exact valuation is challenging to quantify. The lowest valuation arrived at above was \$92,000, and that's after cutting out a serious chunk of debt.

Averaging the above three methods (ignoring the first one), brings us to a price per bitcoin of **\$123,000**. For curiosity, layering in the aggressive (and super flaky) Method 1 brings that





average up to \$207,000. Personally, I think Method 3, which calculates the fair price as \$156,000 per bitcoin, is the most scientific, although this is still finger in the stuff admittedly, given the number of variables in play. And when that finger is in the air, I prefer leaning on the conservative figure, even if it is wrong – especially when that conservative figure is an average of multiple methods.

*“An average of three wrongs makes a right” – Me, June 2022*

## Analysis

I like the spirit of the model. I see the logic and I’m on board with thinking Bitcoin can be viewed as a fiat hedge. I do believe, however, that the calculation may be overly simple. It’s a nice reference point, but models are made to be broken. I don’t think comparing directly to CDS spreads can be relied upon.

We can’t claim Bitcoin is unequivocally a fiat hedge, akin to how these CDS contracts are, so there is inherently an extra risk to Bitcoin. Therefore, it’s aggressive to equate the fair value to the cost of CDS spread-defined insurance. But it’s a start, and to me it makes a lot more sense than a lot of what is happening in the financial market currently. One could also make the very fair argument that Bitcoin offers other avenues to generating return that CDS contracts don’t, which can offset the extra risk. Accordingly, this fiat hedge scenario will carry a relative low weight in the final model below – around 5%, but more on that later.

The model does back up one solid point, however loose the numbers may be. Looked upon in a macro context, Bitcoin is absolutely undervalued. As we discussed in part 1, this is the most incredible macro climate for crypto: inflation spiralling out of control and money printers flying off the hook, with the Fed only realising recently - far too late - that they need to hike. More recently, we have also seen the rise of economic sanctions and asset freezes (Canadian government and Russian asset freezes most notably).

We are in the midst of a debt crisis of unprecedented scale, and money printing is the only way out of it - which just causes a circular error (if you’re like me and spent half of the pandemic stuck in Excel models, you will be acutely aware of how punishing circular errors can be).

Debt	\$30 trillion
CPI	8.5%
Printer	On

Microsoft Excel

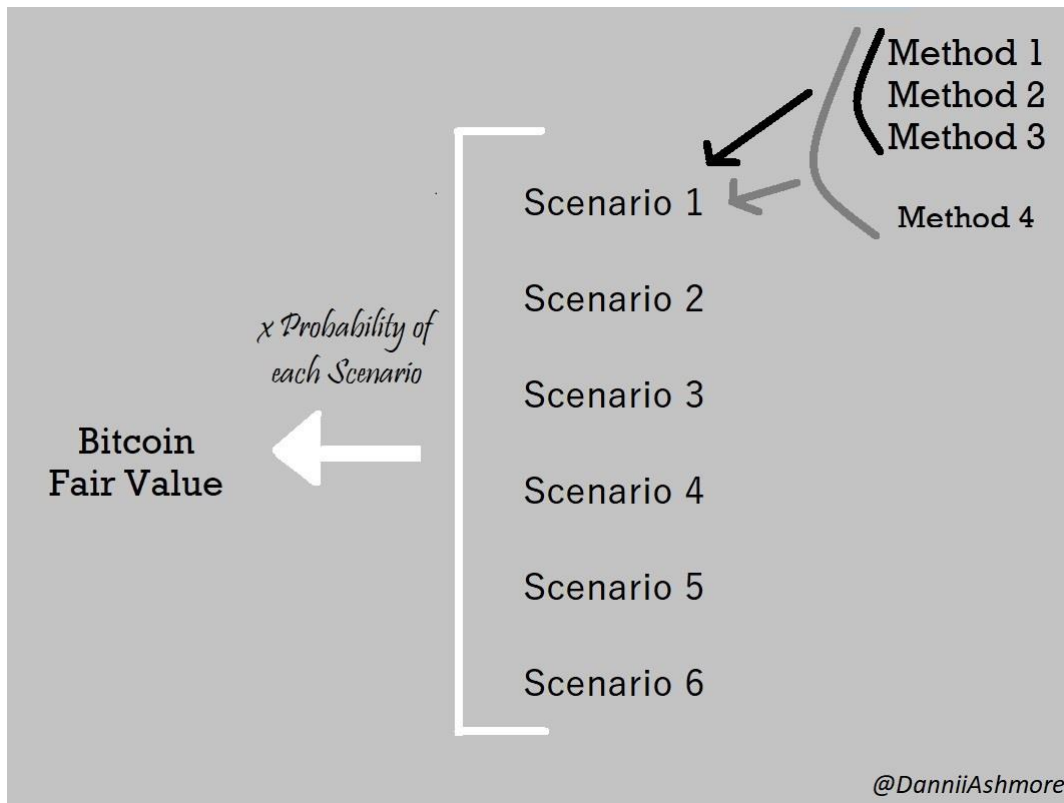
There are one or more circular references where a formula refers to its own cell either directly or indirectly. This might cause them to calculate incorrectly.

Try removing or changing these references, or moving the formulas to different cells.

OK Help

Bitcoin is hedging all this madness (to continue the Excel analogy, its the Task Manager -> End Task option, the only way out of the mess). What’s more, we haven’t even thrown the little sweetener in that is reserve currency angle - which Bitcoin is as well placed as anyone to make a run at. But let’s move on to the other scenarios for the model.





Re-pasting this here for clarity – we have now done the hard bit: calculated Scenario 1 via Methods 1,2,3 and 4. The remaining scenarios are a lot more intuitive.

## Alternate Valuations

### Scenario 2

This will be a little more straight-forward.

If Bitcoin is to deliver on its store of value promise, why not compare to the most established store of value there is? Gold's market cap is circa \$11 trillion. Dividing by 21 million coins (the capped final supply of Bitcoin) gives us a price of over **\$526,000** per bitcoin.

If we want a non-government controlled, scarce asset, gold does present as an interesting benchmark. Obviously, gold is totally impractical – it's heavy, non-digital, can't be transferred easily and well, about 21 million other reasons – but it is scarce, the supply can't be increased and it's fully established. So, if Bitcoin continues to grow, this valuation has to be in the crosshairs.

Silver is less relevant, but for curiosity, Bitcoin reaching its \$1.1 trillion market cap would mean a value of \$51,000 per coin.

### Scenario 3

The third approach is the easiest yet – because we already did it. It derives a value from the IMF paper on reserve currencies in part 3.

I'm just going to say it in advance. This won't carry a lot of weight in the final calculation, because it's too arbitrary a conclusion to depend on. Just because non-traditional currencies



grew X in the last twenty years, does not mean Bitcoin will do the same X growth in the next twenty years.

Nonetheless, it provides an alternate angle, and does put some feel around what we could expect to see if perhaps the most bullish scenario of all comes true – Central Banks start diluting down their holdings of other currencies and flooding into Bitcoin instead.

This would obviously set the whole thing bananas, and the number we get is, as a result, fatter than the US debt balance at \$26 trillion (oh wait, I checked. Still smaller). This equates to a price per bitcoin of **\$1,285,000**.

But hey, like I said, let's relax a bit. The chances of this happening remain remote. It will be assigned a probability higher than zero in the final model, but not by much.

#### **Scenario 4**

I keep referring to the fact that there is a non-zero chance of this happening, and a non-zero chance of that happening. But this doesn't really serve any purpose if I don't assess the full spectrum of scenarios.

#### ***There is a non-zero chance than Bitcoin is worthless.***

I believe the above is a true statement. But before you throw quotation marks around it and put me in a category with economist Paul Krugman (who once wrote a column in the New York Times titled "Bitcoin is evil"), let me explain.

But first, a quick interlude to read this simply delightful quote from the Nobel-Prize winning Krugman, who I won't be letting off the hook:

*"By 2005 or so, it will become clear that the Internet's impact on the economy has been no greater than the fax machine's."*

That's good stuff.

Anyhow, I think any Bitcoin bulls who refuse to entertain the possibility of a failure to deliver upon Bitcoin's immense potential, and an accompanying meltdown into irrelevance, are delusional. I certainly don't believe it is likely (if you hadn't figured it out by now, I hold Bitcoin and am very bullish), but it's absolutely within the range of viable outcomes – it's just a very unlikely scenario, in my (absolutely unqualified) opinion.

Well, if it did drop as low as 1 cent per bitcoin, Michael Saylor would likely buy all 21 million of them, so I guess I don't mean *literally worthless*, but you get my drift.

While Bitcoin has now been de-risked more than any point in its history – think of the mainstream adoption, the number of wallets, the fact you never hear it accused of being drug money anymore – that it truly is mind-boggling to think about where it came from. I believe you had to be a little crazy in the head (in a good way) to purchase Bitcoin in the past. Certainly before the last couple of years, you had to be a bit tapped.

Most prominent, I believe, is the chance that governments could shut it down. Sure, you can't shut down the Bitcoin network itself – which is one of its greatest attributes. But you can, if coordinated on a global scale, restrict the network so much through the banning of miners, the shutdown of centralised exchanges for customers to on-ramp from fiat, the introduction of extreme regulation to prevent institutions purchasing, that Bitcoin could effectively be banned, if not literally.



In this situation, if enough states co-operate, Bitcoin would simply not be able to gain the mainstream traction and institutional adoption to deliver on any of its bullish scenarios.

There are other things to consider too. The long-term threat of quantum computers. Centralisation of miners, or a 50+1 attack. Maybe there is a scenario where CBDCs take over (as a by-product of governments clamping down on Bitcoin), or some other rival asset becomes a superior store-of-value.

Look – I’m spitballing here, and the possibilities are remote. I certainly don’t believe it *will* happen, but that’s not to say it *can’t* happen. And if there’s a chance it happens, it’s going in my model.

Price per bitcoin in this scenario? **\$0.01** (OK Michael Saylor, we will assume you drop \$210,000 to sweep up the entire supply at 1 cent per coin).

## Scenarios 5 & 6

OK! Last scenarios, I promise. And then we hit the probabilities and click calculate. And then you all rush to the exchanges to either buy or sell *all the bitcoins* (I won’t give any spoilers).

These last two approaches are the same method, and I am going to take them from Foss’ paper. They are both very simple and perhaps a little abstract, but remain good reference points. The total financial assets in the world equate to \$468.7 trillion, according to this [study](#) by the Financial Stability Board. Adding in the most recent valuation for global real estate that I could find (via [this](#) report from Savill’s), which is \$326.5 trillion, computes a total financial market cap of \$795.2 trillion.

Note that this, again is somewhat conservative - in 2017, according to Institute for International Finance, the same value was \$900 trillion, and that is the value Foss references in his paper. Foss looks at what price Bitcoin would be if it captured 5% or 10% of this market cap. Dividing by 21 million bitcoins, and using our values for the total global market, this equates to **\$1.89 million** and **\$3.79 million** per bitcoin respectively.

For context, these values translate to market cap for Bitcoin of \$39.8 trillion / \$79.5 trillion. As of Q3 in 2021, the public stock markets were worth \$41.8 trillion. At the end of [2020](#), the global bond market was worth \$123.5 trillion.

I’m of the opinion that it is a little too arbitrary to simply pluck 5% or 10% as probabilities, and I don’t want to get my head stuck in the clouds with scenarios that are *this* far out (I’m already there, you’re thinking - but sssssh, let me finish). As interesting as it is to assess Bitcoin in the context of a global scale, and daydream about what could happen if it were to capture meaningful portions of the entire market, these scenarios will comprise almost no weight in the final model.

Obviously, for this to occur, every bull scenario needs to come off, even more so than the global reserve currency scenario. It is the bull vision of bull visions, where Bitcoin does what Bruno Guimarães has done since joining the Premiership ... that is, completely and utterly takes over.

In essence, it’s the antithesis to the Bitcoin is worthless argument above.

But if this funny coin truly is an asset class of its own, why shouldn’t we compare to total financial assets, I guess?

## Combining Our Calculation



We have done all the work, and now we are ready to input everything into a simple expected value calculation in order to finally do it – calculate the *fair price per bitcoin*.

*\*If you are a novice investor and/or don't have a base knowledge of probability, I have appended a section at the end of the paper explaining expected value in simple terms, as it's important if you want to understand the model*

I've set the model up in the attached spreadsheet so that you can play around with the probabilities (and various prices for each scenario), and compute what *your* fair price will be, but for the moment, in the politest way possible, we are going to do it *my* way.

- The (conservative) average from Approach 1 – that is the fiat hedge method, equating Bitcoin's value to the cost of insurance on worldwide debt - outputted \$123,000 per bitcoin. Let's assign this a **5%** probability of happening.
- Let's assign a smaller **2%** chance of it landing on the more aggressive average for Approach 1, coming to \$207,000 per bitcoin (scroll up if you don't recall the distinction here).
- Approach 2 had Bitcoin equalling gold's market cap, equating to \$526,000 per bitcoin. Let's give this a **6%** chance of occurring.
- For Approach 3 – that is the global reserve currency method calculated in Part 4 of the paper – we got \$1.285 million per bitcoin. Like we said, super aggressive and very loose – so let's give it a small **1%** chance of occurring.
- Approach 4 is the doomsday bear scenario, where Bitcoin is worth nada. Well, 1 cent to be exact, as discussed above. Let's be conservative (have you heard me say this before?). We will give this scenario an **85%** of occurring.
- Approaches 5 & 6 are the mega-bull scenarios presented in Foss' paper, where Bitcoin captures 5%/10% of the total financial market cap, equalling \$1.89 million and \$3.79 million per bitcoin. As I said, this is the perfect world scenario, so we will give each a **0.5%** probability of coming true.

The above scenarios spew out a fair value of over **\$83,000 per bitcoin**.

In visual terms, the below is where we sit:

Logic	Price per Bitcoin	Probability
CDS Calc	\$ 123,257	5.0%
Aggressive CDS Calc	\$ 206,985	2.0%
Gold Market Cap (\$11 trillion)	\$ 526,019	6.0%
IMF Paper (Alternative Currency Growth)	\$ 1,285,091	1.0%
5% share of total financial assets	\$ 1,790,000	0.5%
10% share of total financial assets	\$ 3,890,000	0.5%
Goes to zero	\$ -	85.0%

[@DanniiAshmore](#)

<b>Fair Price</b>	<b>\$ 83,115</b>
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<b>% Return</b>	<b>309%</b>
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And yeah, that's with an 85% chance of the whole thing going to zero.

## Asymmetry

The main point – and why I wanted to set the probability of Bitcoin hitting zero so high - is that Bitcoin represents an incredibly asymmetric investment. For what other asset is it even within



the realms of possibility to discuss a scenario where it matches gold's market cap, or takes a 1% share of the total financial market?

I'm not arguing to place your entire portfolio in Bitcoin – this is an incredibly risky investment (obviously – given we are also talking about it going to zero). But at this point, why not allocate a sliver of your portfolio to it? With an asymmetric payoff, you don't need to be right every time. It's like backing a 50/1 horse to win a race – you only need to win at a 2% clip to turn a profit. It's simple portfolio management.

## Conclusions

Firstly, while it took until Part 5 for me to calculate a price for Bitcoin and draw my main conclusions, I knew halfway through Part 1 what my biggest takeaway would be: Joe - next time you message me on Slack, I'm ignoring it.

Secondly, Foss' paper is fascinating. I love analysing Bitcoin within the context of the macro environment. With countries (El Salvador, Central African Republic), cities (Lugano, Switzerland and more recently Madeira, Portugal) adopting it; with institutional funds pouring in, with companies (Tesla) holding it; pensions purchasing it; ETFs launching; regulation getting onboard – there is so much pushing Bitcoin into the mainstream. And we could soon witness global game theory on the biggest stage of all if bigger nations start buying bitcoins.

Now that the mainstream climate is awash with money printing and sky-high debt, not to mention political concerns around liberty and self-custody, there are myriad push factors here for Bitcoin in the long-term. But none are stronger than fiat debasement.

The path to a place as a reserve currency is also not impossible to imagine, and we are already seeing the dollar weaken - a narrative China, Russia and others will be determined to keep in play. Bitcoin is better placed than any fiat currency to take up the mantle - fiat has had its chance, which is why USD has survived relatively uncontested since Bretton-Woods. If energy ever becomes denominated in Bitcoin (Russia has discussed this recently), then this narrative will become a lot more prominent.

But like I said, the reserve currency angle is merely a sweetener - the extrapolation of what is happening in the credit market, as a result of the debt crisis and fiat debasement, is all we need.

Comparing to the 2008 crisis and digging into sovereign balance sheets in more detail only makes this opportunity all the more enticing. There are those who argue at this point it is irresponsible to *not* own Bitcoin. I don't agree, but I believe that scenario will one day come.

I truly am of the opinion that so much of the greed, ineptitude and silliness in markets is reminiscent of 2008. And Bitcoin could really be the closest thing to a Lehman's CDS contract. But like I keep saying, we need to approach this from a probability point of view. Listen to this: do I unequivocally believe that this all going to burn to the ground? Do I believe I am right here, am I brimming with confidence and pumping all my savings into Bitcoin. **NO.**

But do I believe that there is a chance? **YES.** And given the scale of the asymmetric payoff here, I believe that when accounting for all the probabilities, like I did in my model, that this represents a +EV investment in the long term. Which means I'm holding.

As a poker player and maths nerd, I'm well aware that oftentimes you can get your money in with the best hand - in a massively +EV spot; a made flush against a two pair - and still lose when the board pairs on the river and your opponent ends up with a full house and a smug smile.



But that's how probability works; that's how risk works. And if there was no risk, no one would make money. You were still right, and smug smile buddy was wrong. So allocate responsibly and block out the noise that implies this is an all-or-nothing choice. It's not - bitcoins can split into eight decimal places, and similarly doesn't need to dominate your portfolio.

And what happens to Bitcoin's price when another country comes out announcing it as legal tender? What if a country purchases Bitcoin for its balance sheet? At what point does the balance tip and countries realise they need to buy it merely as a defensive move, rather than an upside play, because everyone else is buying it? What happens when the first G20 nation clicks buy?

That will cause a different kind of contagion – the good kind. There are only ever going to be 21 million of these things in circulation.

Your time is running out.

**Link to Greg Foss' excellent paper, go read it -> [here](#)**

*P.S: Joe - thank you for giving me the inspiration to head down this credit & bitcoin path; it was a lot of fun and I owe you a pint (maybe even two, depending on how Bitcoin does between now and when I get to London). But for now, I want to see the outside world again; I remember it being nice the last time I was out there. And for anyone interested in following a former crypto-head who quit his job to pursue music-making full-time, go follow @JdotKdotB on Twitter*

*PS 2.0: To Greg Foss - thank you for writing your excellent paper and for your generosity to give a total nobody like me the time to run through the Fulcrum Index. An immense amount of this paper was triggered by your analytical approach. Keep doing what you do!*

*PS 3.0: To my sistah Laura thank you for helping out with the formatting and letting me scab off your Canva account for the cover page*

*P.S 3.0 And to the IMF- buy Bitcoin (oh and stop ensuring poor countries stay poor, while you're at it... but thank you for the bailout in 2010)*

*P.S 4.0 Last but not least, to the cafés and frozen yoghurt places of Medellín, thank you for hosting me. Bitcoin may be hot and cold, but Medellín is always warm – for anyone who hasn't experienced it, you need to go 😊*



# Bitcoin: An Armageddon Hedge (Sort of):

## Appendix: Portfolio Management (& Common Sense)

### I didn't lie

Yeah, I said this was a five-part series. What you gonna do?

Nah, don't worry - we're done, really.

I just want to add on one more small piece. Call it an appendix, or an epilogue, or whatever the correct term is - I never learned how to do the writing thing "properly"; I'm a numbers guy at heart (as you can probably tell from the disjointed, capricious structure of this paper).

If you're an experienced investor, or one with a comprehensive understanding of the financial markets, this section isn't for you - you're off the hook and free from my endless ramble. Go do whatever it is you like to do (I've recently discovered I enjoy hiking, which is the kind of thing a 40-year-old divorced guy would say in their online dating bio, but it's true!).

### Everybody Gets Rich Easily

For the novices, however, this piece is important. I'm acutely aware of the influx of a lot of new investors into crypto, and the wider markets in general, that has taken place throughout the pandemic. Hey, maybe even some of my non-crypto friends (I still hang out with them occasionally) are reading this, if only via a morbid curiosity.

Because be it through the vicious FOMO that only crypto can offer, viral screenshots of 100X returns all over Twitter, the constant media coverage of Gamestop, Dogecoin or Shiba, not to mention the access and exposure that fintech apps like Robinhood and Revolut offer, an unprecedented amount of rookie investors have entered the space. Or maybe it's just the relentless inflation forcing people out of cash.

But this section is for that demographic because I don't want to lead anyone astray, and without context or a deeper knowledge of investing and portfolio management, the spiel on Bitcoin from the previous four parts can read like a ringing endorsement to irresponsibly ape in, and that's not my intention.

Despite the fact I have just written over 20,000 words advocating Bitcoin as an investment, I don't want to be painted as a maximalist who is convinced Bitcoin is going to the moon. Because I'm not. My portfolio contains a bunch of different asset types, including over 45% equities.

More importantly, I don't really have any authority to be advising you what to do. Everyone's financial circumstances and risk tolerances are unique to themselves, and that's the key point.

### Balanced Viewpoints

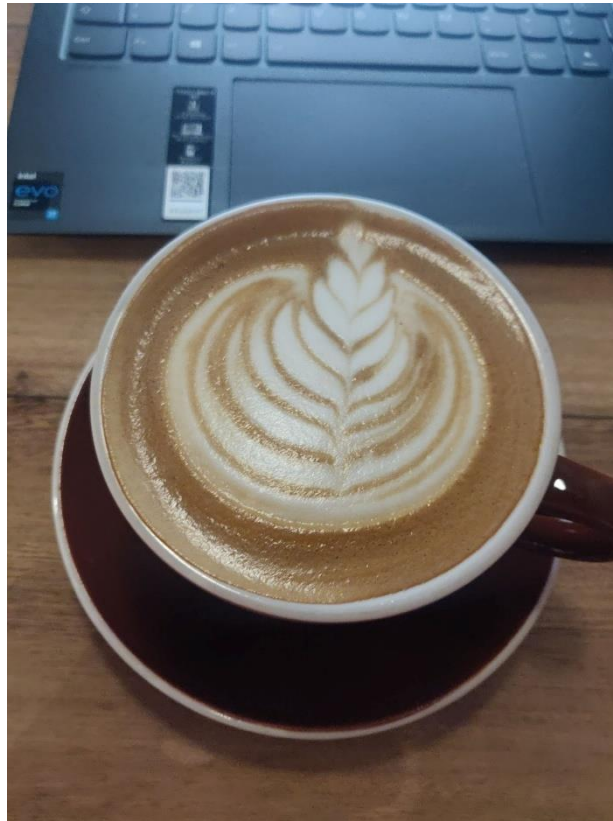
If you read this paper and let it convince you to buy Bitcoin, that's not good. I'm just a boy with a laptop and a smoothie in a café in Colombia (I also recently discovered I love cafés, but I don't come for the coffee. It's like a friend of mine named Geoff – his famous quote is "*I love the beach but I don't like swimming*").

I do drink the occasional coffee though, if only for the seriously impressive latté-art. I only started over the course of this paper really, when I found a few cool ones to work in, and felt





like I needed to order something but had already had a smoothie. I'm just assuming that this art is better than average, because, well, look at it:



*For a non-coffee drinker, is this normal?*

Nah, but in all seriousness, this is important: I obviously believe what I have written, but that doesn't mean I'm right. In 2016 I had a free bet (I was in the midst of my betting arbitrage career, I'll save that story for another time) and I wanted a fun sweat throughout the year, so I decided to place it on Leicester City to get relegated from the English Premier League. They had miraculously avoided the drop the previous year after a late-season charge, had since lost their manager and I thought, why not?

9 months later, they were [Premier League champions](#).

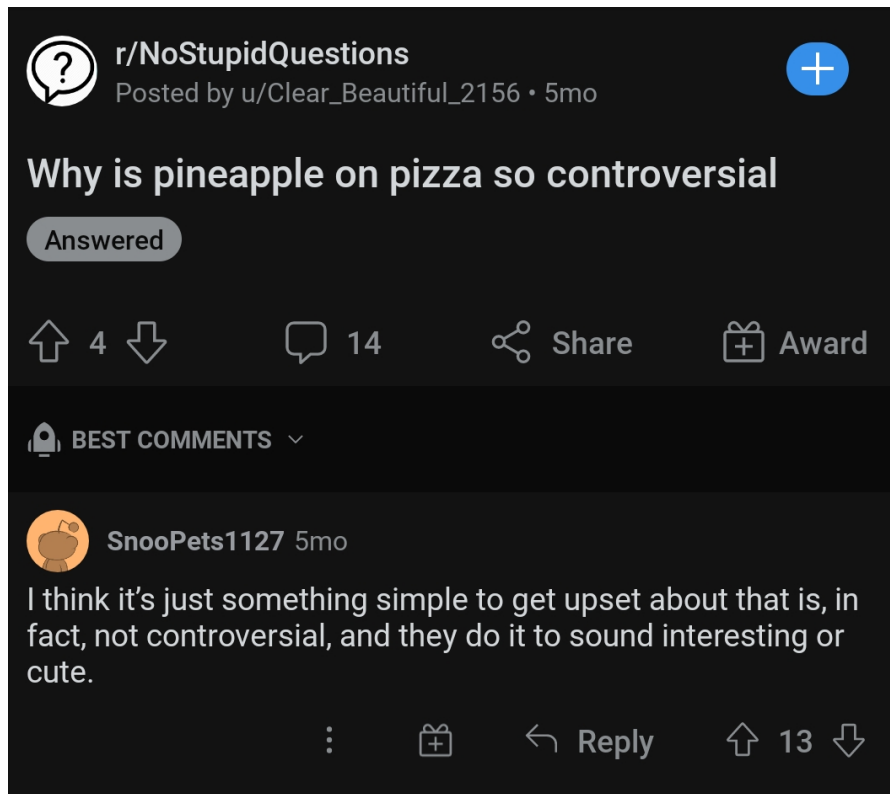
Via ESPN, just to defend my ego:

*"Not only did the Foxes have a 13-game winless run last season, they were only six points from being relegated to a lower level of competition. Leicester City wasn't even in the Premier League two years ago. The club earned promotion to England's top soccer league starting in the 2014-15 season for the first time in 10 years".*

### **Just a Boy with a Laptop**

There are lots of people who despise Bitcoin. In fact, I can't think of any other asset that polarises as much; it really is the pineapple-on-pizza of the financial world (I feel like every time I turn on the radio, the presenters are arguing over pineapple on pizza. There surely can't be much airtime left with that debate, can there? Does anyone care?).





*Reddit user SnooPets1127 sums up my feelings on the debate, truly earning his 13 upvotes*

To illustrate the level of derision that Bitcoin sometimes attracts, take the following quotes:

- Warren Buffett, billionaire investor:
  - *“Stay away from (Bitcoin). It’s a mirage, basically”*
  - *“It has no unique value at all”.*
  - *“It’s probably rat poison squared”*
- Bill Gates, billionaire tech mogul:
  - *“I would short (Bitcoin) if there was an easy way to do it”*
  - *“As an asset class, you’re not producing anything and so you shouldn’t expect it to go up”*
  - *“It’s kind of a pure ‘greater fool theory’ type of investment”*
- Jamie Dimon, billionaire businessman and CEO of JP Morgan Chase
  - *“If you’re stupid enough to buy (Bitcoin), you’ll pay the price for it one day,”*
  - *“It’s worse than tulip bulbs. It won’t end well. Someone is going to get killed.*
  - *“I will fire any employee trading Bitcoin for being stupid”*
- Charlie Munger, billionaire investor:
  - *“(Bitcoin is) useful to kidnappers and extortionists and so forth”*
  - *“The whole damn development is disgusting and contrary to the interests of civilisation”*

You may even be able to make the argument that one or two of those guys are pretty successful investors and entrepreneurs (just maybe). Sure, I’d counterpoint that they’re no spring chickens, and won the geographic lottery by being born into developed countries (not to mention the striking lack of diversity among them), and thus can’t see Bitcoin’s true benefits - but that’s just my argument, which is, incidentally, exactly my point:

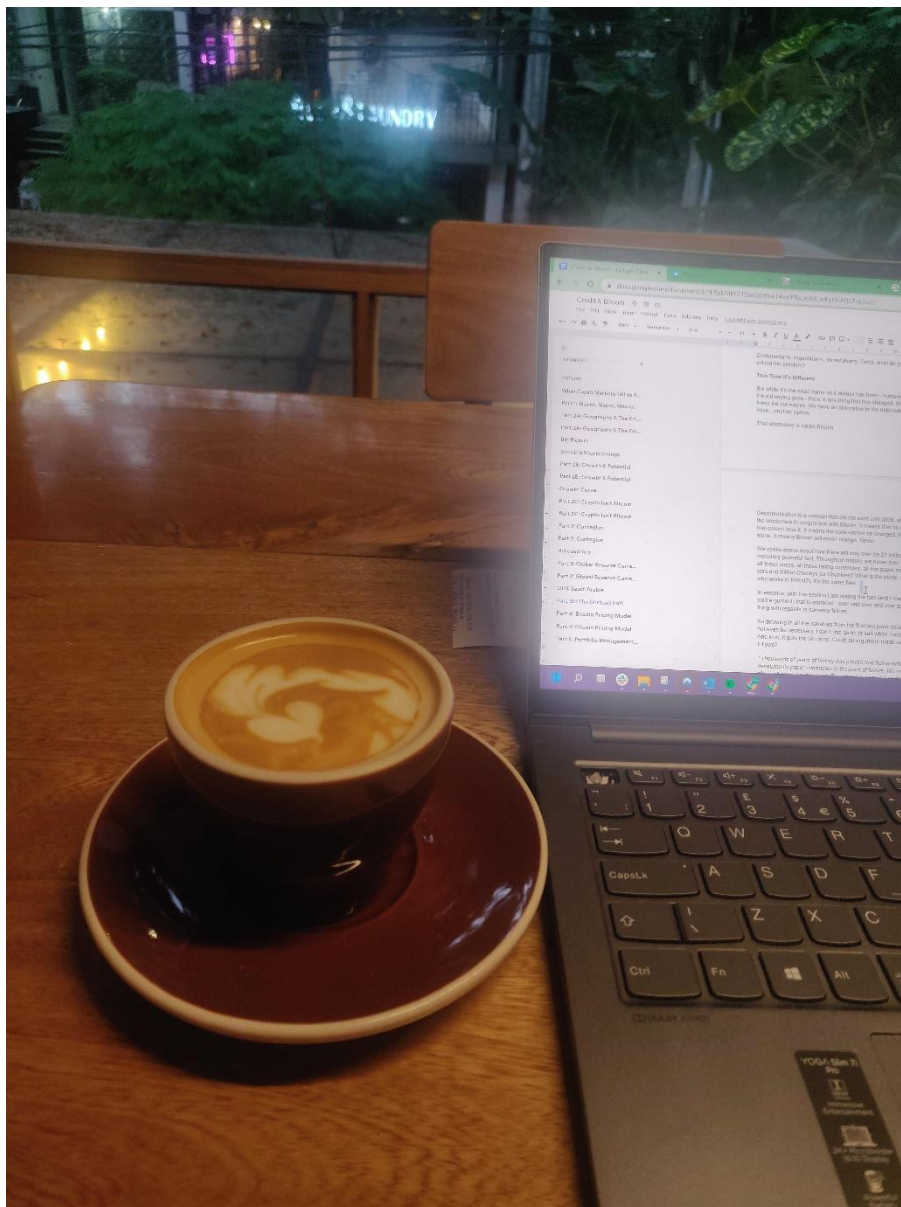
There are many strong viewpoints here, and a lot of subjectivity and dissension. Before you buy Bitcoin, you’re obliged to do as much research as possible, and that includes



understanding why there are so many people - lots of whom are very, very smart - who are convinced this asset is going to zero and is nothing but a speculative Ponzi scheme.

So do your due diligence and steelman the argument. Play devil's advocate and assume it is going to zero; see if you can tear that point of view down. What you should *not* do is take the words of a random boy typing on a laptop in Colombia as gospel, and discount the opinions of some of history's most successful investors as nonsense (even if they are, hah).

If you do that and still agree with me, then, and only then, is it time to buy your Bitcoin.



*I think that coffee a few paragraphs ago was definitely not normal – I mean, this art is good and all, but just pales in comparison to the Leonardo Da Vinci one above*

## Probability & Expected Value

What would I say if you put a gun to my head and asked me, “yes or no - is Bitcoin going to the moon?”. Well, I’d probably say “why do you have a gun to my head, you could have just asked me normally?”. But I’d have to think, because that’s how probability works.



And this is the basis off which the expected value model above works.

Let's take two scenarios.

1.

- I have a fair coin. If it's heads, you win \$10. If it's tails, you lose \$10.
- Therefore, your chance of winning is 50% and your chance of losing is 50%.
- Your **expected value (EV)** can be calculated mathematically by multiplying the outcome of each possibility by the probability of that scenario. So here, your EV is  $50\%*(10) + 50%*(-10) = \$5 + (-\$5) = \$0$
- While we already knew it intuitively, the expected value calculation equalling \$0 proves this is a fair bet
- In other words, if we run this bet a large number of times – say, one million - and calculate who owes who what at the end, we can be quite confident that it will be close to \$0.
- However, if we run it only a few times, the **variance** is higher. Let's say we run it four times. It is conceivable that it's tails four times out of four and you owe me \$40 (in fact, there is a  $50\%*50\%*50\%*50\% = 12.5\%$  chance of this happening).
- In this scenario, you will have lost \$40, despite having an EV of \$0.
- Variance, or chance, is the reason for EV (\$0) not equalling the outcome (-\$40). And the smaller the sample size, the higher the variance.

2.

- Let's take the same fair coin, and again you have heads and I have tails.
- This time, if you win, you get \$12 and if you lose, I win \$10.
- Your EV this time is  $50\%*(12) + 50%*(-10) = \$1$
- Because the EV is positive, we call this +EV (pronounced as "plus EV")
- Because it is +EV, this is a bet you should make. If you make enough of these bets over your investing lifetime, you will be in profit in the long term
- However, let's not forget our friend variance from the previous scenario.
- Despite this being +EV, if we play four times, you could still see four tails in a row and hence lose \$40
- In this scenario, you would have made a good investment choice but lost money

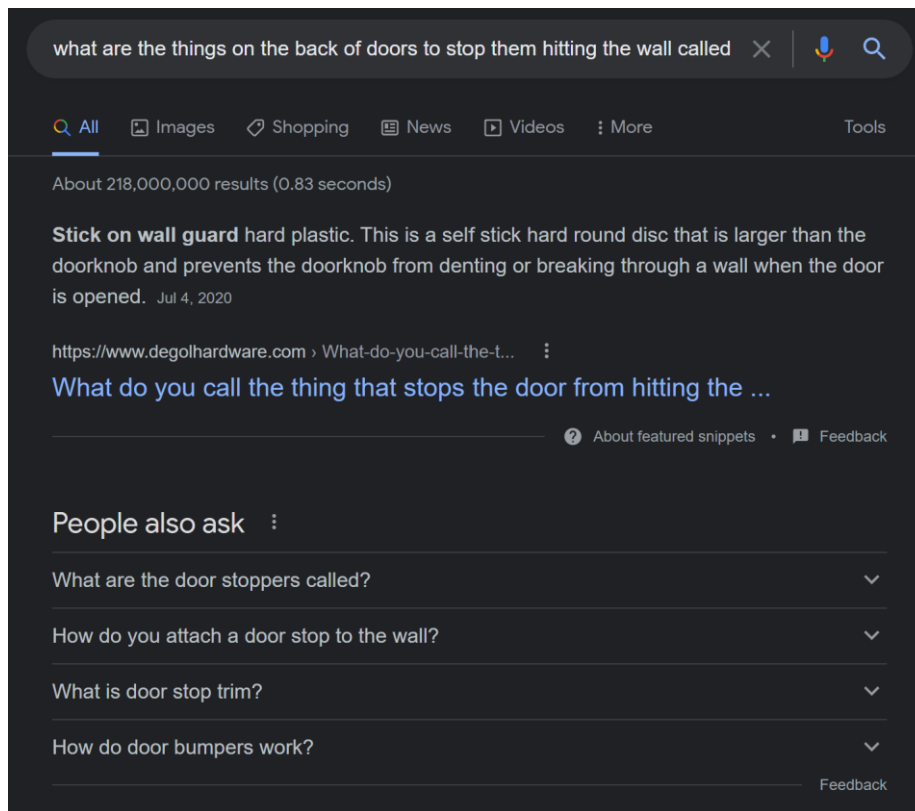
With that little lecture out of the way, let's translate this to our Bitcoin model. My model calculates the intrinsic value - you can look at this as the expected value - of Bitcoin as \$85,000. However, you will also see that this is calculated assuming Bitcoin goes to zero 85% of the time.

So, despite possessing an asymmetric payoff profile which makes it a shrewd investment (in my opinion!), let us not overlook the risk here. This is a highly volatile asset whose dips are as swift and violent as a food poisoning attack in Latin America (strange analogy, not like I'm speaking from experience or anything...).

You could still take a stacked bet, like the second coinflip one, and go broke if you don't manage your risk well enough. If you put your life savings on a coinflip that pays you 10X if you win, that's a fantastic bet in mathematical terms - it's comfortably +EV and if you live a thousand lifetimes and flip it a thousand times, you'll be very, very rich. But we only get one life; there's only one coin flip. So why risk losing it all? Why not just bet what you can afford to lose?



So, ask yourself this, before you mortgage your house to purchase a bag of bitcoins: are you aware that every cent you put in will be privy to the capricious nature of the crypto gods? That your net worth will swing back and forth faster than one of [those weird springy things](#) on the back of doors to stop them marking walls?



*For reference, there is debate amongst the Internet people over wall guard, door stopper and door bumper. Perhaps I'll write up my next 20,000 word paper digging into this issue*

## Portfolio Management

I'm going to start here by showing you the definition of bad portfolio management, from MicroStrategy CEO Michael Saylor:

*"Take all your money and buy Bitcoin. Then take all your time to figure out how to borrow more money to buy more Bitcoin. Then take all your time to figure out what you can sell to buy Bitcoin.*

*And if you absolutely love the thing and don't want to sell it, go mortgage your house and buy Bitcoin with it. And if you've got a business that you love because your family works for the business - if it's been in the family for 37 years and you can't bear to sell it - mortgage it, finance it and convert the proceeds into the hardest form of money on earth, which is Bitcoin"*

The above interview from Saylor occurred in March 2021, when Bitcoin was \$56,000. It dipped as low as \$17,000 since. I bet you're happy you didn't listen to him, huh?

Look, like the analysis above says, I believe this is an incredibly asymmetric asset and a +EV buy. But like every investment ever, that doesn't supersede the necessity to invest responsibly and diversify. Sure, stories of people going all-in on Bitcoin and buying Lamborghinis with the proceeds are great and all - and it definitely happens - but it's not smart.



Besides, for every millionaire who 1000X's their money on such one-asset gambles (see GameStop call options, Dogecoin, cartoon monkey NFTs and those who bet on Leicester to win the 2016 Premier League) there are 100 more who lost it all. I guess that, for whatever reason, the bankrupt bagholders are less inclined to tweet the screenshots of their empty bank accounts than the guy who paid off his mortgage overnight by apeing into \$AMC calls. It's funny how the world works.

## **Risk Tolerance**

Allocate a portion of your portfolio that suits your risk tolerance, which is different for everyone. What age are you? How many dependents do you have? Do you need to make a big purchase in the near future, such as a down payment on a house, or hiring a hitman to kill a professional golfer? (it's halfway through the Masters and Scottie Scheffler has a 5 shot lead. I want some excitement).

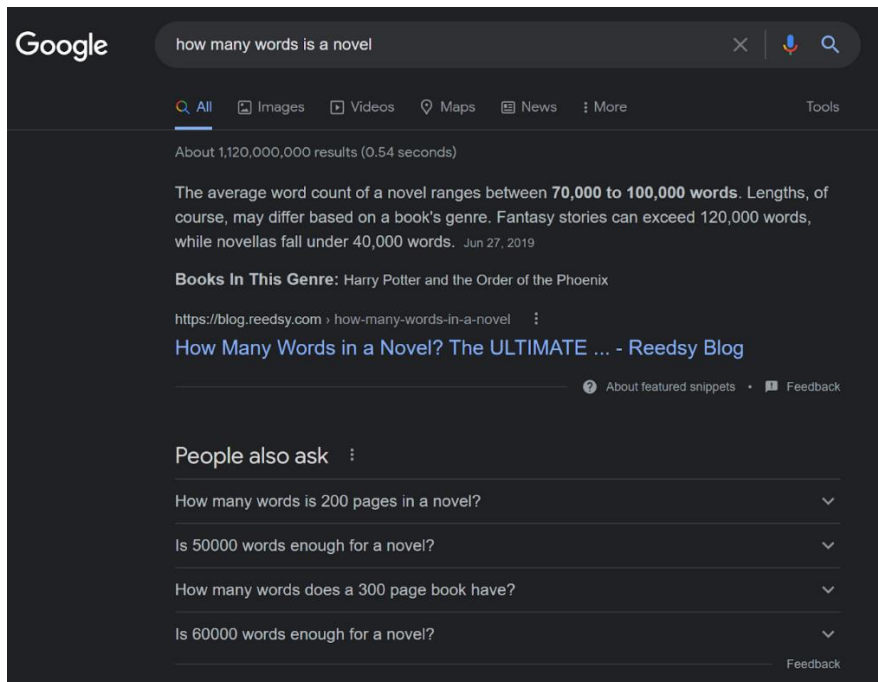
Maybe the mental effects of your net worth swinging are too much, and it's simply not worth it for you to buy crypto. Which is absolutely fine. Everyone has different life circumstances, a varying capacity to take risks and their own financial goals. And anyone who doesn't respect that, like the Michael Saylor's of the world, should be ignored. I would even go as far as saying Saylor's rants qualify as dangerous rhetoric, given there are so many novice investors in the space,

Every investment should always be viewed in the context of your overall portfolio and financial goals. For example, Ethereum is highly correlated to Bitcoin, so if you already hold a big chunk of Ethereum and are considering adding Bitcoin, you need to bear that in mind. Likewise, if you already have a lot of high-beta assets, such as tech stocks, you'll need to consider the risk-return profile of the overall portfolio, not just Bitcoin in isolation. Everyone invests for themselves, and the risk-return profile of their entire portfolio should be assessed in the context of their own financial goals.

And one more thing. If you do buy, just HODL (i.e. hold on for dear life). Don't check the price daily, don't let your emotions get dragged into the circus, don't try buy the dips and sell the peaks. Buy it, hold it, and hope that in the long-term, the fundamentals come to the fore and the world realises it needs Bitcoin.

## **Closing Remarks**





*OK, we good*

Well, I guess that's that. Be smart, do your research and keep emotion out of it. There's a lot of tribalism, toxicity and negativity in crypto, because I guess that's what the Internet is sometimes. But there is also a growing community of warmth, open-mindedness and innovation.

Follow measured people, keep an open mind and be wary of peoples' agendas.

My coffee is cold.

*-> This was a fun project and something I have not done before, so if you read it and have any thoughts/criticism/yoghurt opinions, I'd love to hear from you. Please reach out to me on Twitter @DanniiAshmoren*

