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Define: Cringe

## Current Views

Flat

## Rabbit Hole #1

### Crypto: Too much, or not enough?

I used to publish a monthly long-form piece called Forexplainer, but with the move to Spectra, I'm taking the opportunity to change the name of that feature to "The Rabbit Hole" because these pieces are not always about currencies.

Today, in Rabbit Hole #1, I consider what questions one might ask to estimate the optimal crypto allocation for an investor's portfolio. I'm not a CFP or CFA, and this is a question without a correct answer. What I hope to present is a framework that can help you (and me) think about the decision. Enjoy!

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I was on the phone the other day with a crypto maximalist friend of mine. He is doing well in the sports gambling business and is worth around \$2 million. He has \$1.5 million in crypto (mostly BTC) and \$500,000 in cash equivalents just in case. He said to me:

"Am I dumb to have all that money in the bank? Like, given what's going on in crypto it seems like a huge waste to have all this money in cash. I feel stupid for missing these moves, but I feel like I should have a cushion in there just in case."

I replied: "Umm. No, you are not stupid to keep some money in fiat!" In fact, I was thinking his 75% crypto / 25% cash portfolio is a financial planner's nightmare. But it was not immediately obvious to me what a "more correct" crypto allocation might be.

The question of how much to allocate to crypto is fiendishly difficult to analyze or debate. There are many strange emotional inputs involved including irrational stuff like tribalism and FOMO. The risk/return profile of crypto as an asset class has been historically unprecedented and it is thus more perilous than usual to extrapolate from past results.

That phone conversation (plus the fact I just left an institution where I was not allowed to own crypto) got me thinking about the optimal amount of crypto in an individual's portfolio. Clearly (to me) 75% crypto and 25% cash is a honey badger of an allocation, even for a quasi-maximalist. But what is the "correct" allocation? Without getting into zealous yelling that "bitcoin is going to zero" or "fiat doesn't exist!" ... How do we even think about this?

### **A brief look at asset allocation history before we go down the rabbit hole**

An individual's asset allocation is primarily driven by:

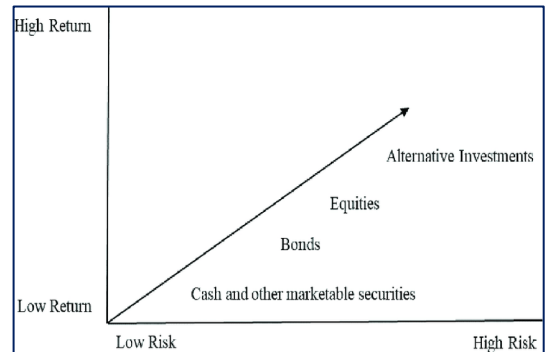
- Age
- Risk tolerance
- Expected liquidity needs
- Expected returns of each asset class
- Volatility of each asset class

And in the olden days (pre-2017) a basic menu of assets looked something like:

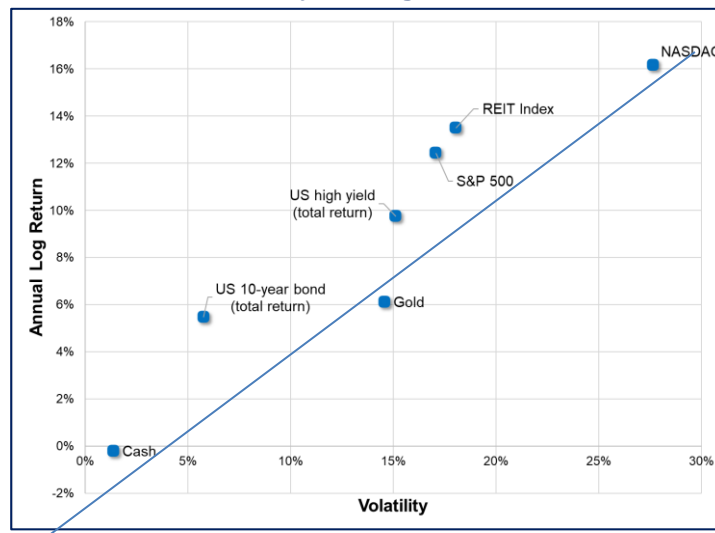
- Cash and equivalents
- Bonds
- Equities
- Gold
- Real estate / alternatives

In theory, those assets have a risk vs. return tradeoff that slopes upward like the chart at right.

But does theory fit reality? Here is the same chart using real-life returns and volatility data from 1990 to now:

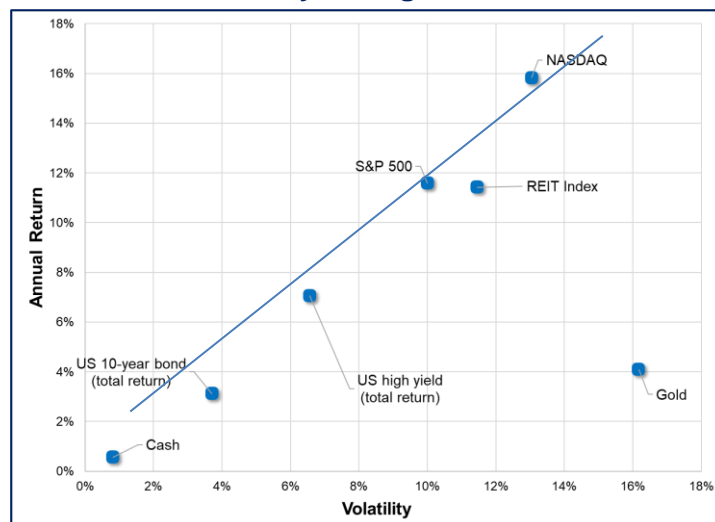


**Asset class volatility vs. log returns, 1990 to now**



Harry Markowitz, you clever, clever man! That is the risk curve you see in many portfolio theory models and textbooks and it is the risk curve that Bernanke was trying to push you out back in 2010. Speaking of which, how does that chart look in the years after QE started?

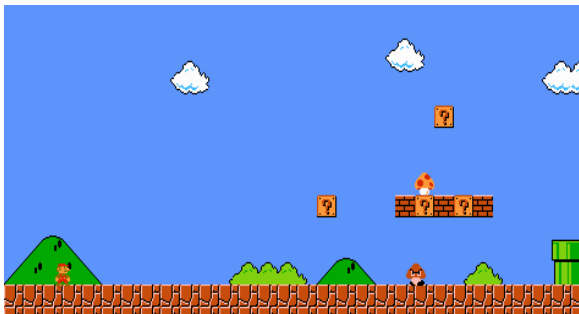
**Asset class volatility vs. log returns, 2009 to now**



The basic relationships have still held up well. Gold has been a notably poor performer in both time periods. It is far too volatile to justify the skimpy returns. Furthermore, the data does not account for gold's negative carry so it's actually *worse* than it looks. Gold does some diversification and apocalypse hedge benefits, I guess. Anyway, getting back to the original question, what happens when we add bitcoin to this thing?

When we include bitcoin, the chart looks more like this:

### Cash and cash equivalents

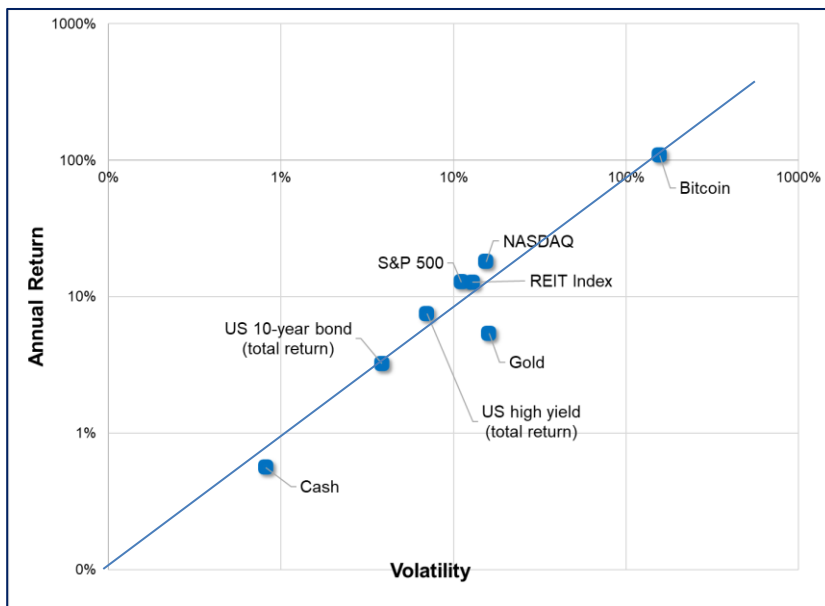


### Crypto



Or, using the original chart format:

### Asset class volatility vs. log returns (including BTC), 2009 to now



*This chart is log, otherwise you would not be able to see anything. I am not cheating; I could have used log for the other charts, and it wouldn't have mattered.*

The theory is still good! Bitcoin has not violated the basic relationship that has ruled most markets for most of my lifetime: More risk = higher returns.

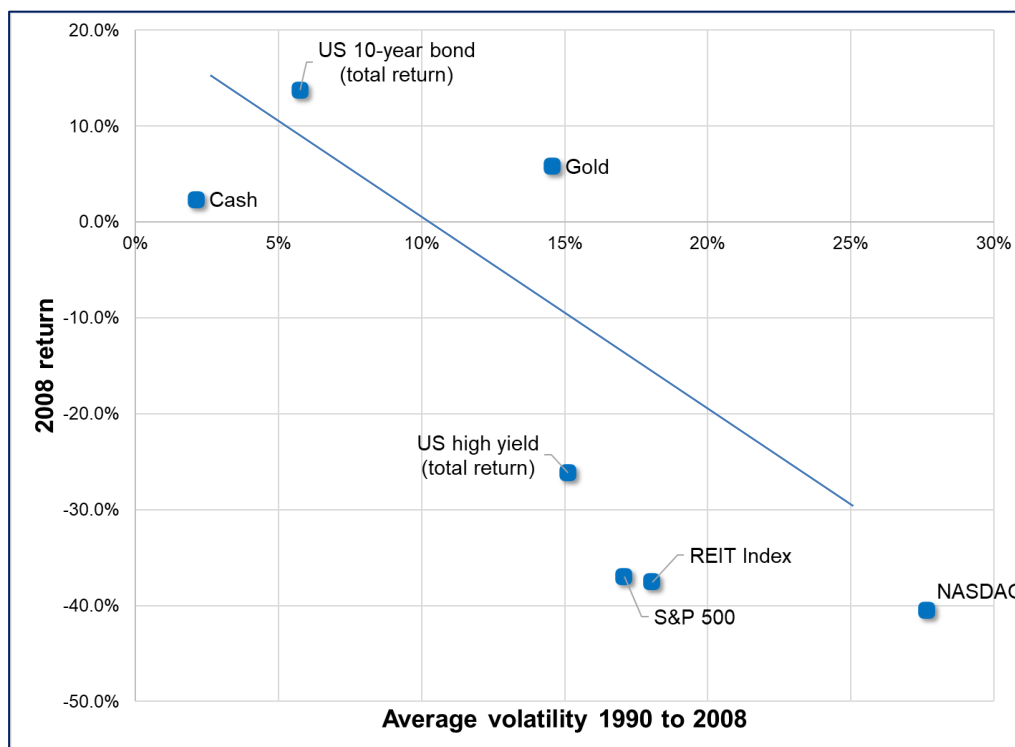
The issue my friend on the phone is having (and many others are having, too) is that the real and psychological costs of holding cash have never been so high. The pain comes not just from negative real rates on risk-free instruments, but from the opportunity cost of not owning things that have gone up grillions of percent.

I hear people say things like “Sure, S&P has doubled off the bottom, but BTC is up 15X!” Assets that doubled in a year and a half are not good enough anymore!? It’s a psychological conundrum that is sucking people into radically risky approaches.

If you are not long the thing that’s going to the moon, you feel short.

But remember: In bad years, the chart flips, as you might expect. Here are 2008 returns vs. average volatility going in:

**2008 asset class returns vs. prior volatility**



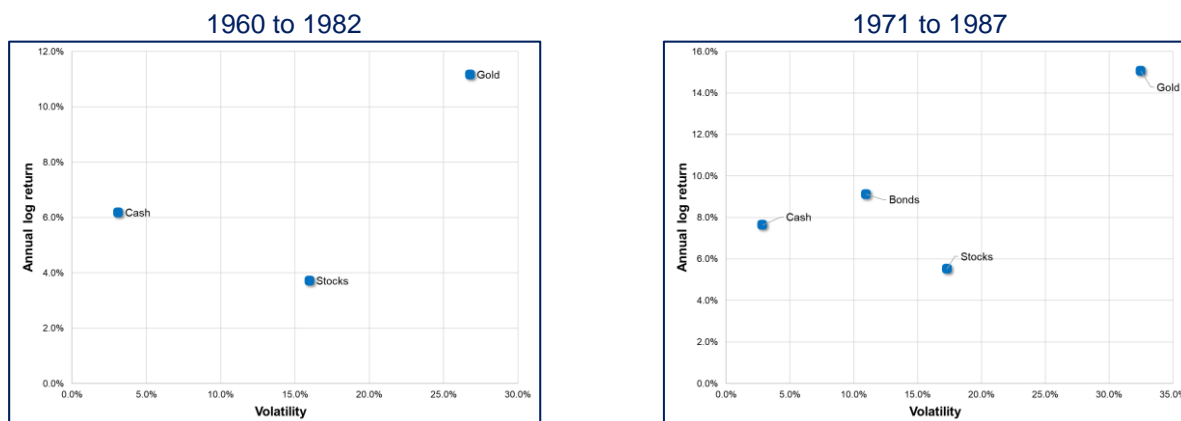
The relationship works both ways.

Still, this risk vs. reward relationship is not a law of physics, it’s just a thing that has generally been true for the past 30 or 40 years. In “[AM/FX: Unanchored](#)”, I talk about the somewhat disorienting reality we face as many ironclad economic relationships we have come to know slowly or suddenly decouple (e.g., taxes and spending, inflation and bond prices, effort and output...). Many logical and intuitive relationships are becoming untethered and as such there is no strong reason to expect the relationship between risk and returns to hold either. In fact, before we entered the Fed put era (1987 onward), there was no trendline at all on those scatter plots.

Let me show you.

The next two charts show the same risk vs. volatility relationship, but with data from 1960 to 1982 and from 1974 to 1990. Those decades were totally different regimes from the slow reflationary regime we are used to. In stagflation and inflationary times, more risk does not always mean more reward.

## Asset class volatility vs. log returns



The partial monetary reset that took place from 1960 to 1982 made gold the bitcoin of that era. High volatility, high returns. In contrast, stocks offered low returns with 3X the volatility of cash. I present these two charts to give you a sense of how important monetary regimes can be. I don't want to get into the weeds on a bunch of boring portfolio theory, but the conclusion is: High volatility assets generally deliver higher returns, but not always. Bull markets and low inflation tend to produce nice upward-sloping return vs. volatility trendlines. Bear markets and inflation tend to produce wonkiness.

### Into the rabbit hole with Enrico Fermi

Back to the original question: "How much of my wealth should I allocate to crypto?". When approaching an extremely difficult estimation problem like this, it can be helpful to employ a technique called Fermi Estimation. This is a technique where we use a series of back-of-the-envelope calculations and rough generalizations to slowly zoom in on a reasonable answer. I have included an example of Fermi estimation in the Appendix.

In the spirit of Fermi estimation, you can use a series of best guesses to zoom in on your optimal crypto allocation estimate. You cannot possibly hit the "correct" answer because there isn't one. The hope is you can lay down a series of assumptions that you feel are not wildly off base and then zoom in on an answer that makes intuitive sense.

Let's revisit the five most important factors that impact asset allocation from page 1 and relate them to our question.

1. **Age.** How old are you? Young people should take more risk than old people because they have a longer sample over which the risk/reward tradeoff can play out. If you're 70 and you're 40% bitcoin and it drops 85% like it did in 2017, actuarial tables suggest you're probably not going to get back to high water before you die. If you're 21, the sample of (*years you are probably going to be alive*) is huge.
2. **Financial needs.** Mortgages and other debts are denominated in fiat and should be considered before allocating to risky assets. Future obligations should not rely on crypto savings because any current obligations are denominated in fiat and should be matched with fiat. Ring fence money you need and keep it out of the allocation decision. For example, do this first:
  - 1) No consumer debt (credit cards, car loans, personal loans etc...)
  - 2) Mortgage easily manageable.
  - 3) 6 months living expenses in the bank.
  - 4) Maxed out employment sponsored plan, or significant monthly contribution to an IRA.

3. **Where are you on the money vs. happiness curve?** Will less wealth make you less happy? Or not really? In general, the difference in your happiness if you have \$20,000 of wealth vs. \$1,000,000 of wealth is large. The difference in happiness as you go from \$1 million to \$2 million will be small or perhaps even undetectable. If you lose every cent of your crypto investment and it doesn't impact your happiness very much, that's not a bad risk to take! If it crushes you from riches to rags, that's bad.

A general statement: You should analyze and understand your wealth vs. happiness curve. If not, you risk spending your time in ways that make you richer but no happier. Where on your money vs. happiness curve do things flatten out?

4. **Risk tolerance.** Do you have diamond hands? One interesting characteristic of the bullish crypto trade is that people don't bail at the lows as consistently as equity investors. This is because the HODLer belief is much stronger than the belief of the random stockholder. Stockholders facing equity oblivion in the face of a crashing economy tend to press the SELL button at the worst possible time (see [yesterday's AM/FX](#) for some research on this topic). If you can't stand an 85% drawdown, your allocation should be smaller than if you know yourself to possess hands of pure, clear, colorless, crystallized carbon.

**Question from the old school:** How much can you afford to lose? Anyone with a Talebian religious belief that bitcoin is inherently worthless should have a crypto allocation of zero. I wish I could be that confident about anything, ever in my life! To me, anyone with 100% confidence on the future of crypto is wildly overconfident. The probability of a bug crashing Ethereum, or a 51% attack, or a quantum computer hack of BTC by a state actor, or a draconian regulatory crackdown is not zero. Your allocation should allow you to avoid ruin, even if your entire crypto allocation disappears.

**Question from the new school:** If fiat loses its illusion and the existing monetary system collapses, what's the least crypto you can afford to own? Anyone with a full-on maximalist religious belief that fiat currencies will collapse in a heap of Weimar-style rubble in our lifetime should be 100% bitcoin, I guess? But nobody should be that confident in any forecast about anything related to economics. The economy is a system so complex the models that are supposed to understand it pretty much only work in hindsight. And you are 100% sure fiat is going to lose? Maxis on both sides need more humility<sup>1</sup>.

Crypto can be seen as a form of insurance against a disorderly unwind or reset of the debt-fueled consumption orthodoxy. Imagine an exit from the debt bubble that resembles the US exit from Afghanistan, and you have a sense of how unpredictable the transition could be. Since I do not believe there is zero chance of this disorderly outcome, zero insurance seems clearly wrong to me. Also, bonds are highly questionable as an investment or diversifier at the zero bound.

**Question in the middle:** Do you believe that financial repression and zero rates are permanent? If yes, your allocation to crypto should be larger. A prolonged and aggressive rate hike cycle from the Fed may severely damage the value of crypto assets, but a series of mini rate hike cycles followed by bonkers QE à la 2020 will juice virtual monetary alternatives again and again. Even if there is no disorderly collapse of the fiat system, there could be a rolling series of larger and larger reflationary attempts that further increase crypto's allure. In other words, it's kinda binary, but not completely.

5. **Volatility.** The standard deviation of monthly moves in bitcoin is 26.7%. NASDAQ is 5%. Bonds are 1%. You can't allocate purely based on expected returns. You have to size it so that if BTC drops 85%, you're not on food stamps. Note that crypto has matured (a bit) and will continue to mature, which should mean lower returns and lower volatility over time.
6. **Correlation.** Bitcoin is positively correlated to other assets (30% positive corr to SPX since 2010). But sometimes it's uncorrelated. And it might be totally uncorrelated in a global monetary collapse.

<sup>1</sup> My guess is that most of the maxis on both sides are using crypto to show off their big, bad 100-pound diamond hands or giant contrarian brains, and the deadly overconfidence they display is half real and half flex.



Let's go back to the guy I was talking to on the phone the other day. He's 35, he's extremely wealthy and he believes that fiat currency is going to lose out to crypto at an accelerating rate over the next five years. But he could be wrong! The point of asset allocation isn't to go all in on the thing you like the best. It's to find the appropriate tradeoff between maximizing wealth and minimizing risk of ruin. Here is how my friend looks five years from now at various % allocations to crypto under different regimes:

### Starting with \$2 million, here's what you have in five years under various assumptions

	Annual returns crypto						
Crypto allocation	-100%	-50%	-20%	0%	20%	50%	100%
0%	2,938,656	2,938,656	2,938,656	2,938,656	2,938,656	2,938,656	2,938,656
10%	2,644,791	2,651,041	2,710,327	2,844,791	3,142,455	4,163,541	9,044,791
20%	2,350,925	2,363,425	2,481,997	2,750,925	3,346,253	5,388,425	15,150,925
30%	2,057,059	2,075,809	2,253,667	2,657,059	3,550,051	6,613,309	21,257,059
40%	1,763,194	1,788,194	2,025,338	2,563,194	3,753,850	7,838,194	27,363,194
50%	1,469,328	1,500,578	1,797,008	2,469,328	3,957,648	9,063,078	33,469,328
60%	1,175,462	1,212,962	1,568,678	2,375,462	4,161,446	10,287,962	39,575,462
70%	881,597	925,347	1,340,349	2,281,597	4,365,245	11,512,847	45,681,597
80%	587,731	637,731	1,112,019	2,187,731	4,569,043	12,737,731	51,787,731
90%	293,866	350,116	883,690	2,093,866	4,772,842	13,962,616	57,893,866
100%	-	62,500	655,360	2,000,000	4,976,640	15,187,500	64,000,000

The grid assumes 8% per year average return for stocks and bonds combined. I played around with the assumptions and the crypto vol is so much higher, the other assumptions don't matter much. The stepped black box shows the area where my friend would have less purchasing power in five years vs. now if crypto disappoints (and inflation is 2%; again, the non-crypto assumptions don't move the needle much).

I think it's possible (but unlikely) for crypto to drop 85% again and there is also a tiny probability of a 100% drop... If that happens, and your allocation to crypto is 20% or less, you are still OK in five years. Above 20% crypto, you may find yourself with less real purchasing power in five years if Crypto Winter 2 arrives. So, we have a range of 0% to 20%. Can we zoom in a bit more?

I think zero is wrong because of the insurance-like qualities of crypto at this stage in the global debt supercycle. I try to avoid the dystopian permabear nonsense but at the same time I can see what's going on. Each wave of QE necessitates another, larger wave as the existing debt pile has become too large to safely inflate away. You can see in the table that even if crypto returns 0% over the next five years, it's not going to kill you if you allocate 10% to it.

Given the skew of potential returns (you can only lose 100% in an extremely volatile asset, but you can make much more than 100%), the gigantic global debt pile, the aggressive trend toward central bank easing at the first sign of deflation, and all the other maxi arguments, you want to own some crypto. 1% barely moves the needle. Even 3% barely does.

But given the binary nature of the bet, the possibility of complete loss, the high level of volatility and uncertainty, and the incomprehensibly large rally already, an allocation near 20% feels way too high. I think most people aged 25 to 50 should be thinking about moving towards a crypto allocation in the 3% to 7% range. Go as high as 20% if you are a maxi with diamond hands.

NOTE: If you're at zero or 1% crypto right now, and plan to get to 7%... You don't need to do it all in one day! With the Fed about to reduce accommodation, we could well be past peak global central bank easing in the short run and so patience is probably a good strategy as you build toward your targeted allocation. Buy a fixed USD amount of crypto each month until you get to where you want to be and once you get to your targeted percentage, rebalance back to that percentage any time crypto goes lower.

## Conclusion

Do you want to take the copious hard work and undeniable good luck that got you to this point in life, and bet it all on an uncertain future via one somewhat binary decision? No, no you don't. That's what the story of Jesse Livermore and many others should have taught everyone by now. Priority number one for every trader and investor is to eliminate risk of ruin. Do you want to leave yourself unprotected against fiat collapse when it's clearly on the bingo card at this point? No, no you don't.

Start with your view on the future of fiat currencies and the global debt cycle. That should anchor you somewhere between a 0% allocation and a 20% allocation to crypto. Then, do a Fermi estimation type of process where you move higher or lower based on:

- Age.
- Liquidity needs.
- Risk tolerance and propensity to panic in a crash.
- Desire to flex in front of your younger, cooler friends.

I think most people should land in the 3% to 10% range. Large enough that the allocation helps you if the debt balloon can't take on any more air, but small enough that your life is not ruined if crypto goes to zero.

**Remember: You only have to get rich once.** Yes, crypto could be the future, but the future is inherently unknowable and rational investors acknowledge this. It's fun to go all-in, but if you do, sometimes you'll lose your whole stack. And when your stack represents your entire net worth, I think that's a terrible bet.

Let the kids on the playground yell "have fun staying poor". Allocate to crypto using logic, not emotion. Sure, you might miss another moonshot, but you also might miss the next 85% drop.

good luck ↑↓ be nimble

*Thanks to my crypto friends for proofreading and logic-checking this. Writing about crypto can be fraught.*

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If you enjoyed this note, and have an interest in asset allocation and the growth / value discussion, check out my March 2021 conversation with Howard Marks here:

<https://www.epsilontheory.com/a-conversation-with-howard-marks/>





Correct answer: None of the above.

## **APPENDIX: Fermi Estimation**

The classic Fermi estimation goes something like this:

We want to estimate (x), the number of smartphone repair stores in the United States. We start making statements and assumptions that slowly help lead us toward an answer.

First, what is the number of smartphones in the United States? We can arrive at this number through a series of guesses that slowly zoom in on the answer.

1. I guess around 90% of people 10 to 65 years old have a smart phone and most of the very young and very old do not.
2. I think 75% of the population is 10 to 65.
3.  $(.90 \times 0.75 \times \text{the population of USA (300m)}) = 202.5\text{m iPhones.}$

People keep a phone for about three years. 33% of phones are busted or cracked over that period years and I guess 90% of the people get their phone fixed and the other 10% do not.

One phone every 3 years  $\times$  33%  $\times$  90% = 9.8% of phones need to get fixed each year. That's about 20 million phones. I guess a phone takes an hour to fix and the stores that fix phones have one full-time employee producing 6 hours of labor per day.

6 hours  $\times$  6 days/week  $\times$  52 weeks is 1,872 hours of labor per year, per store. That means there should be around:

$$x = 20,000,000 / 1,872 =$$

There are roughly 10,700 smart phone repair stores in the United States.

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