ReSolve ASSET MANAGEMENT

Adam: **00:00:56** We were just discussing how we could render laser eyes for some of us on the call.

Rodrigo: **00:01:03** For the video.

Adam: **00:01:05** To figure out how to do it in advance for the video.

Rodrigo: **00:01:07** Isn't it when we said we hoodwink people because they think where going to talk about Inflation but we're just going to talk about Bitcoin, because it's the cure for all?

Mike: **00:01:16** Yeah.

Rodrigo: **00:01:17** Including inflation.

Mike: **00:01:18** I was thinking what we should've had is, we all should've had our Jim Rodger's 'Hot Commodities' book up in front of our cameras pretending to be reading them before we did this session on Inflation & Commodities, which are maybe, loosely connected, I mean who knows. Connective tissue may or may not be that strong there, but I don't know.

Richard: **00:01:47** Not if you trust the CPI, but there are other measures for sure.

Adam: **00:01:48** Hold on, let's crawl before we walk here.

Mike: **00:01:54** Oh, I thought you guys wanted me to go quick and be just loose and goose, I mean come on let's roll.

Adam: **00:02:00** Am I going to do the Gestalt Disclaimer because I'm the most serious around here, so I want to make sure that everyone knows that you should not take anything said on this Podcast seriously. Everything should be taken with a huge grain of salt? It's for informational purposes only and none of the themes, concepts, or insights that we offer on this Podcast represent investment advice and past performance of our intellectual properties is not indictive of future results.

Rodrigo: **00:02:34** Oh, my god.

Mike: **00:02:36** With that kind of disclaimer, we can do anything.

Rodrigo: **00:02:49** This is how Butler does it right? He just goes on like, so aggressively that we never ask him to do it again, and then he's off the hook, it's a classic Butler move.

Adam: **00:02:58** Well, I thought that was the right mix of saying all the things I needed to say plus a little ...

Richard: **00:03:03** You've covered all bases and then you can say-

Rodrigo: **00:03:04** He didn't say that it was also for entertainment purposes, you forgot about that one.

Adam: **00:03:08** I did say that didn't I? Oh, maybe not.

Rodrigo: **00:03:09** No, you said informational.

Adam: **00:03:11** Cheer's gentlemen you're so entertaining.

Mike: **00:03:11** Cheers again, all right.

Rodrigo: **00:03:15** Happy Friday.

Adam: **00:03:16** Well, hold on what are we drinking? I'm drinking Bourbon.

Richard: **00:03:19** It's pretty obvious.

Mike: **00:03:21** Appleton and Diet Coke.

Rodrigo: **00:03:25** For those listeners dying to know, Richard held up a Stella Artois and I have a Moscow Mule.

Adam: **00:03:35** A Russian Donkey.

Mike: **00:03:37** The sound is just intoxicating.

Adam: **00:03:39** That's true. So, the theme, the topic today is Inflation, in particular, I think Commodities, because we recently published a paper on commodities and I think that asset class is often misunderstood. We should do something like a *Google* Trends. Can somebody do like a *Google* Trends on Inflation or something?

Mike: **00:04:04** Good idea I can do that.

Inflation and Commodities

Adam: **00:04:06** But I think the idea of inflation has certainly entered the investor/market zeitgeist, and we certainly have been getting a lot more inquiries about inflation. How we're measuring it? How institutions and investors might hedge it. We have of course continued to frame the idea of how to hedge inflation in the context of just a broader discussion around diversity, and balance to give the integration of the different portfolio components. So, just backing it right up, we are under the pretense that asset markets are driven by unexpected shocks in the dimensions of inflation and growth. Typically, investors have growth pretty well covered, they typically have a lot of risk in an equity basket, whether it's sort of domestically oriented or more of a global equity portfolio, but they've got growth typically covered.

The bond component is typically designed to be their hedge against disinflation or deflation or lower than expected growth, but is typically under-represented from a risk standpoint in the portfolio, what is often missing is this inflation basket, because certainly developed stocks are not sort of fundamentally designed to profit from inflation. A really good example of that I think is, if we were to look back six to eight months at the cap weighting of the S&P 500 or the U.S. Wilshire 5000 or Total Market Index, energy and materials and especially mining within materials had vanishingly small weights, and the sectors that had the largest weights were for growth sectors, typically tech, consumer discretionary, these types of things, and these tech names which are typically expected to accrue the vast majority their earnings far out in the future, they're like high duration assets.

So, they are particularly vulnerable to a backup in long rates and so low and behold, we've had a massive backup in long rates over the last couple of months, and in that time period, the cyclicals, the energies, the mining etcetera, have dramatically outperformed, and technology has kind of lagged this rally. The developed market indices are not a good way to hedge inflation for this reason, and so you sort of need to think about other ways to hedge it. TIPS are one way, they hedge a certain type of inflation, gold hedges a certain type of inflation, and commodities as a basket hedge a different type of inflation. I think we're going to talk about the different drivers of inflation today, and then maybe zero-in on how commodities can play an important role that can't be played by any other sector.

Mike: **00:07:16** Coming from the computer lab we have the results of the 'inflation' word search, which is just a moderate breakout in the last little while here since sort Feb 14, Valentine's Day. But what is funny is the country with which inflation is searched the most. What country do you think that might be?

Adam: **00:07:40** I'm going to guess Canada, is it?

Mike: **00:07:41** No.

Adam: **00:07:42** Not, Canada? Who's got a better answer?

Mike: **00:07:44** Go ahead who's going to get it, it's very obvious?

Adam: **00:07:48** Venezuela?

Rodrigo: **00:07:48** Zimbabwe

Mike:	**00:07:51**	Zimbabwe, still the number one global search is Zimbabwe, which is so interesting because this kinds of brings the humanity to the practice of investing. When you think about your human experience, so me as a Canadian and Adam you as a Canadian we have very different experiences with respect to inflation, vis-a-vis Rodrigo and Richard right. We've never experienced a hyper-inflation or massive deflation via a fiat currency. In Canada we have being impacted somewhat and we do feel that '03 to '08 and the huge cycle boom that happens in Canada, but nowhere near the effects of the two sort of emerging sort of market fellas here have, so maybe I'll pass that over to you guys.
Rodrigo:	**00:08:40**	Like when we're you born Mike?
Mike:	**00:08:44**	I don't want to say, 1967.
Rodrigo:	**00:08:46**	We're babies.
Richard:	**00:08:47**	What kind of question is that?
Mike:	**00:08:48**	He's calling me out, I was just nervous.
Rodrigo:	**00:08:52**	All right, I'm trying to move on, I won't we're over it. The U.S. dollar purchasing power was cut in half in the '70s right, at some point?
Mike:	**00:09:04**	Yep.
Rodrigo:	**00:09:04**	… like a six the year period was …?
Mike:	**00:09:03**	The Canadian dollar was insanely strong, that's the funny thing. I recall the era of Jimmy Carter was when the last time that the U.S. dollar v CAD was par, prior to when we came into this resource boom in that '03 to '08 area, where the Canadian dollar ripped up. As I was living that it was kind of a novel experience and I would say to myself "Gosh I remember when I was a little boy" I don't know I was like five or seven, and I saw a magazine with Jimmy Carter on the front of it, and him being crushed by this Canadian dollar and it's so funny that …
Richard:	**00:09:44**	Why was that? Why was the Canadian dollar so much stronger? Was it because of natural resources, in particular gold?
Mike:	**00:09:49**	Gold and oil, right, we're trees and rocks.
Richard:	**00:09:57**	I know there are other ores that I guess would kind of make up the basket of-
Mike:	**00:10:01**	Bobby Orr, all of them.

<u>Inflation in South America</u>

Rodrigo: **<u>00:10:04</u>** Inflation is such an interesting thing. Inflation in South America is a constant part of our lives, just cyclical. Peru has been, since that 7000% inflation, which I've said already too much during this podcast, it's kind of hovered between three and four since then, but places like Argentina just seem to have like a five-year cycle where they blow up their currency. What is interesting when you speak with people there is how they adapt.

One of my closest friend's dad's runs a series of magazines and the way he survives it is, he doesn't really care about the currency much, because he just sells space in his magazine. He barter's. He goes to the doctor's office and says, "Listen I have this doctor's magazine and I'll put in an add for it, but you have to take care of my family for the rest of the year."

He's got a travel magazine that he barters for flights and stays in different places around the world. He's constantly having vouchers as he calls it, in order to be able to handle the vast majority of what his basic needs or above the '<u>Maslow's Hierarchy of Needs',</u> in order to not be affected by whatever the central banks are going to decide to do to their currency, and so you adapt in that way.

We're going to talk about commodities and all that, but I think one of the key aspects of how you can protect yourself is to think if you have a cash flowing business, whether you can have the type of business that can easily increase your cash flows or can be structured in such a way that can allow for your standard of living to remain relatively equal. So, you just get to adapt, and a lot of people in South America, so a lot of people have to live with that. In Brazil Richard, up until recently-

Richard: **<u>00:11:50</u>** 1980s.

Rodrigo: **<u>00:11:54</u>** Weren't you're yields like 16% three or four years ago?

Richard: **<u>00:11:58</u>** A while ago it was closer to 10-years ago, you know prime has fallen to about 2% right now, which is historically, we've never had it this low, but in the 1980s we had quite a strong inflationary process that led to a number of currencies just being thrown out the window, and eventually they created this mechanism between the Real which is the current currency and the previous one, they created this intermediary unit meant to break the back of the inflationary momentum, the self-fulfilling prophecy of inflation.

So that inflationary expectation, which in the MMT circles is considered to be non-existent, there is no such thing as inflation expectations for that economic thinking. In Brazil it was very much a real thing because prices were being retagged in supermarkets two or three times per day at some points, and we did have for three months, what would be technically considered hyper-inflation in the late '80s early 1990s, I believe 70% monthly inflation kind of thing. Then finally the Real came along and rates were at one point at least 40%, 50% in the '90s, and then eventually came down. A lot of that as well had to with the repositioning of the Sovereign Debt Market moving away from U.S. denominated debt to Brazilian Real, to quench that dynamic in the latter part of that period. But yeah, South America is very much accustomed to this and North Americans have no idea how lucky they are.

Adam: **00:13:42** No, one here is really making a case that North Americans need to be preparing for South American style inflation, but it is interesting to note that North American's do have sort of an isolated existence, and certainly those who were not of adult age in the 1970's doesn't have any visceral experience with inflation, and therefore, the emotional salience that might drive decision-making is absent. So, you sort of need to be able to project yourself into that emotional space and say "What if? What if?" So that is what we're trying to cover here.

Mike: **00:14:18** That's precisely the point Adam, I think those who don't have the experience, I know for me personally, not having the experience and talking to Rodrigo, and Richard really helped me more emotionally connect to the fact that these things happen, that you do get debasements. You get these fiat occurrences as well where all of a sudden there's a sudden transient, what many people are calling a 'Transient Inflation.' I mean that's great, it's transient, it just means it passes quickly and happens quickly and then all of a sudden, the underlying currency that you're holding is worth less, not worthless but worth a bit less and it happens quickly.

I think those formative years will shape some of your thought processes around these and I find sharing the formative years of others who have had very different experiences, helps me sensitize myself to those things. We had what would be called 'Transient Inflation' in the '70's. Maybe it's not that, I mean maybe there's a great case and Richard you pop this out regularly that there's a whole bunch of productivity tidal waves that potentially can reduce the cost of the production of goods, in many ways. That tidal wave continues to grow. Things like machine learning, AI, optimizing everything from transportation & oil fields, These are potentially world-shaking deflationary mechanisms.

Adam: **00:15:56** Disinflationary mechanisms.

Disinflationary Mechanisms

Richard: **00:15:55** Automation in farming for instance. Things that people don't even talk about but I think right now there's a lot of hype, I shouldn't say hype, but there is the feeling there is pressure when it comes to costs, and it's manifesting in several different places. I would say probably say grains have been a major one, even in a deflationary environment of last year with the corona crash and everything, grains were up double-digits, soy was up I think 30%, corn was up another 15 or so, and that feeds not only into grains themselves, but also for feeder for livestock.

Rodrigo: **00:16:36** The supply chain gets affected.

Richard: **00:16:40** But the supply chain gets even more affected by energies, like in the last just year plummeted, but in the last six months is rising quite a bit, oil's breaking new highs and that has real strong ramifications across the board, so I think that's something we might want to dig into a bit more.

Adam: **00:16:56** Well, look let's indulge our macro ennui for just a few minutes and sort of describe maybe some of the dynamics that are leading people to become concerned about inflation. I think a lot of it stems from Stephanie Kelton and the 'Deficient Myth: MMT and the Birth of the People's Economy'. The idea that Congress just passed a $1.9T stimulus plan, they are planning to directly line the pockets of individuals with brand new minted cash. The question is where does that demand impulse manifest, right?

If it manifests in the consumption of certain types of goods, then obviously there is going to be some kind of supply shock and it will be some time before supply can keep up with this excess demand, and that will drive prices higher in certain goods, and potentially drive the prices of commodities higher.

I think the governments all around the world are beginning to embrace this idea that they're not constrained by the size of their deficits or the size of their debt, but rather they are constrained by the productive capacity of their economy.

So, to the extent that your economy is productive enough to allow for money printing to ensure that there is sufficient demand, up-to-the point where supply can be offered to meet that demand, then we should make every effort to provide enough fiscal stimulus to create that level of demand, and as a result maximize employment and the well-being of the citizenry.

Richard: **00:18:46** Sorry Adam, just a quick distinction there. The $1.9T has been issued as 'low powered money' right. The MMT idea is to actually print money that is not beholden to any sort of debt. As of yet it's part of the Overton Window, it's now discussed in policy groups. It is considered, but has not yet been implemented, at least not in this last bill that was passed and about to be signed by President Biden. It's still sort of low-powered money in the sense that there still is more debt going to be issued at least as far as its been structured, so far.

Adam: **00:19:25** Well, the plan is to draw down the general account and so they don't need to …

Richard: **00:19:29** Issue more debt.

Adam: **00:19:31** But we've seen a pretty remarkable backup in rates. We've seen some failed auctions and there are certainly some signs of tightness, and discomfort along the curve. So, I think it's reasonable to be concerned about the fact the Fed may be forced into acting more quickly than they'd like, as a function of this either, you know excess amount of bonds, lending that needs to be raised, and or demand shock showing up in different parts of the economy.

Rodrigo: **00:20:13** Well, another angle to this whole thing is that you have massive stimulus checks going out to everybody with the belief that the sole thing it will do will be to increase demand, individuals will get it into their hands, and they are going to go out and shop and buy items and try to fill the gap that's basically been deflationary because of the coronavirus essentially.

But as I speak with friends and family that are running businesses there is another interesting inflationary push here, and it's the fact that when you have people getting free money, my friends and family who own businesses, are not able to get bodies to get to work. From receptionists to law firms that are trying to get more hours, and the partners are making more money than they've ever made in one particular law firm, one of the largest law firms in Toronto, because they have to work more hours because, they can't get associates to stay long enough for them to help.

They just cannot give them enough money to come to work, because in their minds they're getting a pay check. They'll wait it out, it's not a stigma right now to really be unemployed, and so that's putting prices pressures up. They're willing to pay double for an associate than they ever have before.

Adam: **00:21:38** I would love to see if, is there any actual statistical data to back that shit up, because I don't know. How short-sighted are people, like they're going to get stimulus checks for a few months and extended unemployment payments, and then all of that is going to go away. So, are they burning all of their employment bridges "Yeah, man, get stuffed - I don't really want to come to work for the next three months because I'm going to get paid, and I don't really care that you aren't going to employ me for the next six months?"

Rodrigo: **00:22:07** These could be part of the transitory inflation Adam. It could be part of the transitory inflation, but if you ask around how easy it is to get low-level employees to work for you right now, it is much more difficult than before. Do you remember Kevin Jardine, who we had on a couple of months ago? He can't get his receptionist to come back to work, so you are hearing it all over the place. Maybe it is transitory but it's meaning they are having to pay more to get … they are asking for more money.

Richard: **00:22:39** Unskilled labor.

Rodrigo: **00:22:40** On unskilled labor, so it's either going to show up as transitory, or it's going to be maybe-

Adam: **00:22:47** Okay, so I'm just going to derail this whole thing right off the bat? How does this fit with your UBI?

Mike: **00:22:59** It's terrible, UBI is …

Adam: **00:23:01** The one little anecdote about some dudes …

Rodrigo: **00:23:06** I gave you three anecdotes in my defense.

Richard: **00:23:09** Ladies and gentlemen, we are pivoting the podcast now, we're actually going to be discussing political philosophies.

Mike: **00:23:14** Yeah, it's okay.

Adam: **00:23:15** I just love that like three stories…

Mike: **00:23:18** Let's save that for tonight's discussion maybe.

Adam: **00:23:21** Yeah, well see. I need one more drink Philbrick, just so Jason Buck knows the word is transient. He's just bastardizing it, it's not transience. Mike said it right.

Mike: **00:23:40** I did? I'm dyslexic, I barely say anything right.

Rodrigo: **00:23:48** I think the point we're trying to make is that when people speak about inflation, often at times they talk about either CPI, or I guess if I want to protect myself against inflation it's going to be gold, or if I want to protect myself against inflation, I'm gonna use TIPS that are tied to CPI. But as you start exploring the demand pull inflation, or supply push inflation, and you start looking at these different metrics it turns out that inflation manifests in very different ways.

It can manifest in asset prices increasing, housing prices increasing, different areas in the commodity complex increasing at different times. So, it's a much more complex topic than the simple "Inflation is going up, I have to get myself some gold." "How has that been working for your lately?"

Mike:	**00:24:37**	By the way gold is not really correlated very well to inflation, it's like a .2 or .3 correlation, it's very low.
Richard:	**00:24:46**	It correlates with real interest rates, and with money supply.
Mike:	**00:24:49**	And with volatility in equities, strangely enough.
Adam:	**00:24:56**	With inflation expectations.
Mike:	**00:25:02**	I'd have to dig deeper into that one.
Mike:	**00:25:04**	Causation, I don't know you tell me.
Rodrigo:	**00:25:09**	Look, I think this is a stat from Raoul, where median household income hasn't increased since the mid '70s in the United States, and the only thing that has been able to keep up with those expenses has been gold, so maybe momentarily correlating ...
Mike:	**00:25:27**	Actually, Rodrigo what you've had is asset inflation. What you have is there's been a perfect hedge to one of the biggest inflations we've had which is asset inflation. The sad part is that there's a very narrow part of the population that can take advantage of the asset inflation, but that asset inflation is occurring and has been driven by certain steps that central banks have taken to try and pull us out of this particular set of circumstances. So, maybe it's all inflation but again, there are other types of ways that inflation is going to manifest. I'll try and bring it back to the commodities discussion, the one thing about commodities that is so useful in regard to trying to prepare a portfolio for inflationary outcomes, is the sort of heterogeneity of the complex of commodities. That was a lot to get out of my mouth.
Adam:	**00:26:33**	I think every time I say heterogeneity we need to drink.
Mike:	**00:26:34**	Heterogeneity.
Rodrigo:	**00:26:35**	Cheers.

The Heterogeneity of Commodities

Mike:	**00:26:36**	I'm going to say it a lot. As a commodities complex is really unparallel, but it's not that it's just different, it's different in its reactions to those inflation and growth dynamics. When you think about equities in general the kind of, that school of fish swims similarly. If you move to commodities, and there's actually very significantly schools of fish, and you really have to think about that very carefully as you

prepare a commodities exposure within your portfolio. What you really want, you want you commodities exposure to be significantly different, so that your geometric mean return of your portfolio improves with the inclusion of that.

Adam: **00:27:30** I think that your absolutely right, I feel like we got a little ahead of ourselves because part of the other benefit of heterogeneity is that we just don't know where the inflation is going to come from, right?

Mike: **00:27:42** Precisely!

Adam: **00:27:47** So, it's not like investing in commodities is new. Lots of institutions have been investing in commodities for many years, and there was certainly a major surge in interest in investing in commodities in the early 2000's. So, as a function of that, some commodity indices were popularized like the Goldman Sachs Commodity Index, there's a Dow Jones Index which was bought by Bloomberg.

A lot of these indices kind of go hand-to-hand so they are renamed every time, but there are some really common indices that have attracted a lot of assets, and one of the interesting things to note about these indices is that because they are designed to accommodate massive amounts of institutional flows, they need to construct them so that the heaviest weightings in the indices are in the most liquid commodities.

So, if you sort of x-ray through these indices, a lot of them are in the neighborhood of 30, 40, 50% in the energy complex. And I can hear the argument that energy flows through a broad spectrum of costs in the economy. It's an input cost to a wide array of things. I think you can make almost equally a cogent argument in the same direction about grains, metals, there are reasons why each of these different commodity sectors might create inflation for different reasons, for different supply/demand dynamics.

What you buy when you buy a traditional index is basically a hedge against rising energy prices, and the rest of the hedge is kind of incidental. Energy is also very volatile. So, from a risk budget standpoint the over exposure to energies dominates from a cap weight standpoint, but it dominates even more from a risk budget standpoint. This is I think a major missed opportunity for common commodity indices, which is understandable, because the objective is not diversity or homogeneity, but rather capacity.

Rodrigo: **00:29:58** Do you guys see the different major commodity indices?

Richard: **00:30:04** Can you zoom in, one instance Rodrigo?

Rodrigo: **00:30:13** These are some of the oldest ones, and most of these have being designed to be able to take in a lot of money. One of the reasons why I think institutions decided to buy in on this in the early 2000s is because there used to be this roll yield if you looked at the data, that you could capture from commodities. There was a little bit of yield that was enough for the institutions to say 'Okay, these are at least have some sort of positive expectation', but with all the money that came in two things happened. That roll yield has kind of gone away, more importantly you had to create indices that could take in that load. What you're getting exposure to here for the most part are energies, as you can see from the Goldman Sachs Commodity Index especially. The question is, everything that's been discussed here is about the different ways inflation can seep in, and I think there was a comment from Jason Buck earlier in the chat room about-

Adam: **00:31:12** Don't give that too much attention you know you'll never …

Rodrigo: **00:31:14** Weather related inflation is a real that is going to affect your portfolio right, so we like to talk about the Fed, we like to talk about how MMT is going to be a problem, but the weather is changing. We're getting global warming and it's affecting crops and those crops are going to lead to costly agriculture that's going to lead to food inflation. So, you have to hedge all of these different bets not just the energy bet.

Richard: **00:31:43** A global reduction of arable land has been a problem that has been mentioned a few times in the last few years, so that is also something that plays in, the grain complex rising so much, made the manifestation of that to some degree. But I think something that we haven't mentioned yet that is quite important in the whole commodity conversation is the role the dollar plays, I mean we had Julian Brigden here last week and the 'dollar cycle,' because the dollar was such a major component of the global monetary system up until the Breton Woods System in 1971, and then that broke down. But also because of how every commodity on the planet or pretty much all of them is quoted in dollars, so a weaker dollar begets a higher price of commodities in all of these other currencies.

Adam: **00:32:38** Well, that's a really good point so it just sort of goes to show there's a correlation between inflation, the trend in the dollar and the shocks to different types of commodities. I want to sort of raise another sort of spectre. This is from my earlier days in investing and goes all the way back to Don Coxe.

I remember him talking, his core thesis was about the 'Rise of the Middle Class' in these really gargantuan emerging economies: Brazils: the Russia's: India's: China's: BRICs, and it's really cool, it's triggering because we just had a conversation with Raoul Pal. He was giving us the case for what was going on in India, and just the unbelievable investments in technology, and adoption of different technology solutions in the India Stack, that are enabling Indians to become banked, to do transactions using finger prints, other biometrics.

And this is the way that huge emerging economies rise from the third world to the second world to the first world, and one of the first things that happens in every single instance of an economy moving from third, to second, to first world is you get a massive uptick in the consumption of protein. It's protein heavy grains, and protein heavy meats, so even a small income shock leading to a demand shock in a place like India with 1.3B people, it's going to have a massive impact on demand for grains and livestock. These longer-term themes are also, they tie in and interact with climate trends etcetera, but they shouldn't be ignored and could also be massive drivers of commodity type inflation.

Rodrigo: **00:34:37** Look at the end of the day this could all be solved by technology companies that are able to manufacture meat based on laboratories, you know been able to do … What are these …?

Richard: **00:34:50** Synthesized meat.

Rodrigo: **00:34:52** So, again, we've never been the type of group to try to tell you there's going to be this massive inflation. I don't want anybody to take away from here that we're saying you need to buy all the grains that you can to hedge against this. What we're saying is this is a narrative that is out there that could happen and we need to protect against that.

If a lot of these inflation factors are going to show up in the commodity complex, the many different sectors, how do we hedge against that knowing that independently, commodities don't tend to offer any yield? How do you justify having a zero returning asset in your portfolio just in case something happens in the future because the Roll Yield is kind of dead?

Adam: **00:35:40** If you look at the performance of these indices basically, they've had a zero return. Most of the time that those indices have been live they've had basically a zero return, it's a negative return.

The Risk Premium From Commodities

Mike: **00:35:53** We're talking about the Risk Premium that would come from commodities markets, which is either non-existent or transient. In both cases though useful. Again, we come back to, if the objective is to diversify a portfolio, and you're thinking about the portfolio's asset classes from the perspective of the drivers of those asset classes, those inflation and growth dynamics that we've all talked ad nauseum about. Then it does make sense that when input costs rise unexpectedly, that there is going to be some impacts through that inflation and growth dynamic, and you will be able to offset some of those impacts in your portfolio via a thoughtful exposure to those commodity markets. That makes sense to me.

Rodrigo: **00:36:50** I think we talked a little bit about in the past how we've used the rebalancing of a Risk Parity Portfolio that requires the groups of asset classes to be non-correlated to each other from a structural perspective. Of course, the discussion got totally hijacked by the inflation discussion. Well, Adam did some work on 'Let's see how many bets exist within the commodity complex, then let's see what the rebalancing premium is in just the commodity complex. How diverse are they really?' If they are indeed as diverse, then maybe there's a yield that you can pull away from that in a more thoughtful way. I have the paper up Adam, so why don't you walk people through kind of the basics here.

Adam: **00:37:41** Well, let's back it up. What are we looking for? Why do people invest in equities? I mean you can pick an argument pneumatically about your position to take advantage of growth, and productivity, I think that's reasonable. But the other thing is, is there is a historical precedent for equities delivering a premium over cash and that, on a global basis is about a 4% premium. Four percent premium per/year on average for global equities over treasuries and that comes with 16% to 18% annualized volatility, standard deviation of returns.

The question is, do other asset class allocations to sleeves provide a similar type of benefit? If you look at bonds, well bonds you get a lift from duration, so if you invest in longer term bonds you typically get a lift from the fact that you're taking on inflation risk you're unable to roll your bonds at a high frequency, and therefore, you're vulnerable to a major rise in inflation that happens over the duration that you hold the bond, and so you get paid for taking that risk.

Then also you get paid a little bit of credit risk on corporate bonds, you get this combination of credit risk plus duration risk, gets you some kind of bond premium. Typically that's on the order of 1 ½ % to 2% a year. But you get that at a much lower volatility, more on the order of 4%, 5% or 6% a year depending on whether it's rates like treasuries or you add some credit risk. So, equities and bonds deliver about the same long-term premium relative to the risk you have to take. There has always been an argument that there are no premium for commodities. The Commodity Premium is zero. If you look at the performance of commodity indices like the traditional indices, in fact the premium is negative.

Rodrigo: **00:39:44** I'm going to bring that up right now so-

Mike: **00:39:47** Fundamentally, I mean it's truly a zero sum game. On each side of every contract is a participant.

Adam: **00:39:51** Totally, and it has been zero sum for—let's go back to 1990 so 30-years. The thing is the Commodity Premium is not exclusively dependent on the performance of commodities. It is also dependent on the diversity and the volatility of the commodities themselves. So, if you go back to the sort of the Rebalancing

Premium paper, what we see is, there is a premium just from rebalancing, like regularly rebalancing between markets with reasonably high volatility and a large amount of diversity.

The more diversity and endogenous volatility in the markets the higher the rebalancing premium, and this plays right to the commodities sweet spot, because commodities typically are highly voluble, just ambient high volatility without any leverage, and there is a very large number of independent bets in the commodities base. So, if you just examine the premium from commodities, you're in the neighborhood of 3% to 4% per year from the Commodity Rebalancing Premium, and guess what?

They have about the same risk as equities, and once you sort of diversify across all commodities, so you've got the same expected risk premium from commodities as you do from equities as long as you're taking maximum advantage of the amount of diversity within the commodity space. I think this is the thing that has been missed by most other arguments for commodities along the way.

Mike: **00:41:42** Absolutely, one of the major points. It comes back to … How do you say it again? Heterogeneity.

Adam: **00:41:50** Yeah, absolutely. Somebody fell asleep on their keyboard and I'm trying to read the morse-code, the dot and the dash.

Richard: **00:42:03** I'm just trying to clean away Jason Buck's comments.

Mike: **00:42:05** Maybe SOS, I don't know.

Richard: **00:42:09** What is interesting about all of this is the inflation doesn't really need to manifest, the inflation expectation of that rise in prices is what it's all about. I was looking at copper just now Copper rose 20% last year and there might've been some supply and demand dynamics there, but a lot of this I'm sure had to do with the ESG narrative, and the trend that you're going to have electrified cars in the coming decades, and there isn't going to be enough copper.

So, copper has joined the floor in being one of the attractive commodities that is going to benefit from this coming environment, and I would also just point out that CPI expectations or rather the break-even inflation expectations that the markets tend to use, have been somewhat affected by the Fed's purchasing of TIPS as well. So, that has skewed the measurement somewhat but again, the expectation is, all that is needed in order for these trends to manifest and for investors to be able to harvest the benefit of holding some of these commodities.

Mike: **00:43:28**

It's an interesting question Richard. What do we do, given some of the signals that we would normally rely on to potentially think about the problem are contaminated, how might we do that? I think we've been circling around this, but you should always have some assets in the portfolio that are diversified, integrated, and thoughtfully deployed in order to be prepared for whatever inflation manifests.

We want to advocate first of all, this is not a call on inflation, it's certainly become an interesting topic at the moment, I don't care honestly because we're always prepared for the manifestation of inflation in portfolios. So, the base case always has some part of the portfolio that is interested in making sure that we're always ready. The next thing is 'Well how else might you improve the portfolio outcomes by expanding that a bit more?' From that Richard, we come back to 'What do we do now that some of what were very easily and reliable inflation hedges like a TIP-bond are now being influenced by an actual feedback loop, so what do we do now?'

Adam: **00:44:42**

So, just to be clear, I think the assertion is that TIPS should be an effective hedge against CPI Inflation. Then it raises the question in the context of the current market dynamic if the central banks are going to engage in Yield Curve Control. We've already seen demonstrable massive acceleration in demand for Treasury Inflation Protected Securities, not just at the Fed but other central banks. To what extent are they going to distort the ability for these traditional inflation hedge assets to play the role that they are designed to play in the portfolio?

Then of course you can go a level deeper. The value of the bond is reset as a function of changes in CPI, but guess who sets the CPI inflation basket? Obviously, the government who issues the bonds also sets the inflation basket. So, there is the potential, and I don't want to get too conspiratorial, but there is the potential for the issuing entity to change the terms of engagement on the contracts.

Richard: **00:45:59**

You don't even need to go that conspiratorial, I think we were talking about this offline but it all boils down to Goodhart's Law. Once your measure becomes a target it ceases to be a good measure so, once the Fed has this idea that CPI is not going to rise too far above 2%, and they keep telling us for now, and maybe for a transient moment the markets don't believe them. Given the fact that the Labor of Bureau Statistics—I think that's what the LBS stands for, controls the basket of CPI why would that change in disfavor? Why would they allow that to go in disfavor to the Treasury?

Rodrigo: **00:46:47**

So, this is an important point right, because we just actually launched a 10-part series called our Master Class. In the first episode we talk about what listeners should be paying attention to what we're saying, and we put a limit of $10B as the largest kind of amount of money that made sense, because beyond that you have no choice but to just use things like TIPS in order to be able to hedge a portfolio. What we're going to talk about today and the idea of the commodity context and benefits of the Rebalancing Premium and the benefits of that diversification, are not attainable for multi-billionaire pension plans, they're just not.

Mike: **00:47:33** They are subject to limitations.

Rodrigo: **00:47:34** That's right they're subject to limitations like any single entity.

Adam: **00:47:38** No, flip that, I'm surprised you didn't flip that. Small investors have a massive advantage.

The Smaller Investor Advantage

Rodrigo: **00:47:44** They don't have enough heterogeneity, do you know what I mean?

Mike: **00:47:50** I'm mad at myself for not. Did you say heterogeneity? Cheers! Not only did he say it but I repeated it so it's two.

Rodrigo: **00:48:03** So, the reason that TIPS had to be lobbied for and have as much demand as they have and are seen as the only inflation hedge in commodities to kind of put by the wayside is, because the vast pools of money can't use them. But if you're smaller and you actually have access and you don't have to buy the index, you can do a lot more with those different sectors in the commodities space than any large institution can. I'm just going to keep on bringing this back to the paper that we wrote. I lost audio there.

Mike: **00:48:41** You should because honestly from the conversation, I would not know that we wrote two great papers (1) The Re-Balancing Premium (2) Popular Commodities. I want to explicitly state those now that people need to read those immediately or this conversation isn't going to make any sense.

Rodrigo: **00:48:59** So, the key here is, okay you're a smaller investor and you're somewhat sophisticated or you can find someone who is somewhat sophisticated and be able to play in the space of commodity, and you're worried 'Maybe, I shouldn't buy any commodities because there is no yield I can get.' Well, I think we've talked about the Inflation Premium as being a very important asset of creating a synthetic yield.

In this chart here of Figure IV of our White Paper we show just a theoretical expected Rebalancing Premium. If we have three unique bets in the portfolio, if we have five unique bets, seven, and nine. So, if you only have three unique bets in the portfolio and you expect a zero rate of return, you can from a re-balancing perspective, gain as much as 2%.

If you take it all the way to nine bets which is what we end up finding on average in the commodity complex you can be as high as 4% premium, and it gets higher if indeed we do see an upward drift in the securities, in the commodities that you hold. You don't have to fret too much about whether it might not pay off because there may not be any inflation, still hold and have that inflation hedge and still yield something that is as competitive as bond yields and equity yields if not more.

Adam: **00:50:27** I was going to say it's useful for people to recognize that the commodity indices have had a really crappy time over the last little while, and equities and bonds have had an absolutely phenomenal time. Equities and bonds have delivered risk adjusted performance at two standard deviations above their long-term average rate over the last 10-years.

Maybe notwithstanding for bonds for the last six weeks, but for U.S. equities especially and bonds, this has been an absolutely terrific time because we've had a disinflationary growth environment, and obviously that's been the perfect kryptonite for commodities and commodities have gone nowhere. But there have been other decades and longer than decade periods through history where there has been lots of inflation, and no growth and bonds and equities have both done terribly together, and commodities have done just phenomenally well for many years.

It's tempting to sort of look at these commodity returns like the drift in commodities over the last ten or twenty years and say 'Well there is nothing there', but the reality is over the long-term, even if commodities on average, like if you take all the individual commodity contracts and you say 'On average they have a zero expected return', simply re-balancing between them can generate a 3% to 4% return just because of the Re-Balancing Premium that you get from the entropy of such high diversity, high volatility assets in the portfolio.

Mike: **00:52:16** I feel like you said those words to avoid saying heterogeneity so that we had to drink.

Adam: **00:52:17** I knew you wouldn't let me get away with it.

Mike: **00:52:26** It was a nice work around honestly, I am really impressed at the fancy words you used to avoid saying heterogeneity again, that was specular.

The Rebalancing Premium

Rodrigo: **00:52:39** Adam why don't you go ahead as people look to find this Rebalancing Premium in the most liquid and popular indices. Why don't you walk them through Figure-V, so we can have a bit of perspective here?

Adam: **00:53:04** The idea here is, getting back to the high-level of concentration in most of the popular commodity indices, so the GSCI Index on the left is the most popular commodity index by AUM, and just using the constituents of the index at the weights in the index, because it's so highly concentrated in energies, it represents very few bets, like 1.2 bets.

I don't want to dwell on this, because we do this all the time but the number of bets is equal to the weighted average, where the weights are the portfolio weights, so the weights times the volatility of each of the corresponding assets, the sum of that divided by the portfolio volatility given those portfolio weights. So, assuming diversification squared, that is the Diversification Ratio. A higher Diversification Ratio implies a larger number of bets in the portfolio, or independent sources of return. A higher magnitude of heterogeneity is what we're measuring here.

Mike: **00:54:09** Until that happened, the viewership was dropping like a rock.

Adam: **00:54:15** Exactly, so I wanted to answer the question, can we create sufficient, like a high degree of heterogeneity or large number of bets from the same group of markets but just by weighting the portfolio differently, to maximize diversity?

Richard: **00:54:36** I'm going to need another drink.

Adam: **00:54:37** So, if you're just looking at the GSCI using the existing index weights, you get 1.2 bets. If you take the same constituents and maximize the Diversification Ratio of the portfolio, maximize the number of bets, you get 6.7 independent sources of risk from the same group of assets. Again, how does this translate? This is going to come in the chart below, but this translates directly to the expected Re-Balancing Premium.

So, all things equal, in other words, we're still talking about the same group of assets, they all have the same ambient volatility and commodities are a gift because they have a natural very high level of ambient volatility, and you've got this diversity. If you maximize the diversity, you go from the index weights to the maximally diversified weights, you go from an expected Rebalancing Premium of 0.3% per year for the index to 2.9% per year for the maximally diversified portfolio of the exact same constituents that are in the index. You can obviously see the same type of phenomenon across all of the different indices, so just giving a hint of what's possible, if you take all of the available commodities that you could liquidity trade, and you constantly seek to maximize the diversity of that portfolio and therefore, maximize the Rebalancing Premium, the potential you can get from this incredible heterogeneity.

Mike: **00:56:06** Here we go! Cheers.

Adam: **00:56:09** I've got to get more ice.

Mike: **00:56:14** Hit them with the re-balance, come on, hit them with the number, it gets you …?

Adam: **00:56:19** So, it gets you 3 ½ %, 4% per year.

Mike: **00:56:25** How does that compare to the Equity Risk Premium?

Adam: **00:56:27** Thanks for asking because as mentioned the Equity Risk Premium is about 4% per/year, so in fact you get about the same volatility or slightly less because a maximized diversified portfolio of commodities has a lower volatility than equities, because of its diversity and you get the same premium as we've observed over the very long-term for a diversified portfolio of equities, so it's pretty remarkable.

Mike: **00:57:01** In your studies Adam how much did that vary? If you look at the Equity Risk Premium and you can go decades with it with it being non-existent, then decades with it being two times what it was. What did you see in the Rebalancing Premium?

Adam: **00:57:18** I love this question actually. What is the Equity Risk Premium derived from? Its derived primarily from the skewedness of what I've heard called the 'capitalist distribution', so the vast majority of stocks actually deliver returns less than treasuries. There is a very substantial proportion of all stocks that have ever been created and listed on exchanges that go to zero and then there is another large portion that are dormant, they don't really do much. They go up they go down, but over the long-term they're kind of flat.

The entire Premium that we've observed, and this is U.S. data, but I suspect there is directionally similar conclusions from global indices, but the entire Equity Risk Premium that we've observed in U.S. equities has come from 4% of the companies that have ever been listed. So, it's really this bet on the skewedness of the 'capitalist distribution'. There is a small number of companies that are successful over the long-term that deliver the entire Premium.

But there is actually not much diversity within the equity universe because the vast majority of the risk in equities is a function of this sort of cyclical risk. When there is a Bear Market almost all equities go down together. When there is a Bull Market, they all kind of rise together. Sure some sectors rise faster than others in different environments or whatever, but there really not that much diversity.

Richard: **00:58:39** It dictates it all.

Adam: **00:58:40** Exactly yeah, so there is a large amount of variation in the Equity Risk Premium depending really on growth shocks, are we observing higher than expected levels of growth over a sustained period? What determines the expected Risk Premium which is the diversification premium in commodities, is the diversity of commodities. I will sort of admit that for example, in the late 2000s after institutions had adopted commodities as a major asset class sleeve, the liquidity needs of institutions began to dominate the correlation characteristics of commodity portfolios, so they tended to trade together a little bit more than they had done historically. Then as they liquidated portfolios through 2008, 2009, and 2010 and everyone lost interest in commodities that diversity re-emerged, so it's not that the diversity and therefore, the heterogeneity. Man, I have to pour myself another drink. The heterogeneity of the commodity portfolio.

Mike: **00:59:44** Don't say it twice just say it once.

Adam: **00:59:45** I know, I'm just trying to get …, sloshed, does change through time, but it changes for different reasons, it changes because the commodity sector becomes more homogenous at times and more heterogenous at other times. When it's more heterogenous then there is a higher expected premium, when it's more homogenous, then it's a lower expected premium. They will both vary but for different reasons and I think that's also a really nice benefit, because structurally you have diversification in the expectation of the premium.

Rodrigo: **01:00:17** I was just going to say that we're constantly continuing to try and increase that yield so that we can participate in case there is an inflation shock across all of these commodity complexes. One of the questions asked was "What kind of role does it play in getting you're commodity exposure?" And this is a popular implementation of trying to get that inflation protection in a bunch of papers, and intuitively it makes sense. You apply trend. When something is popping you get in. When it's not, you short it.

But the trend factor hasn't really been that fantastic all the time just like anything else, just like the Risk Premiums, the number of bets, it comes in and out of favor and so we took it a step further. So, the first easy way to capture that excess yield was just through the Rebalancing Premium. It's a beta play and it's a more thoughtful beta commodity complex, and that in fact should get you covered for the most part.

In the spirit of the trend discussion and I think the 'Dragon Portfolio' doesn't get exposure to commodities but gets exposure to commodity trends, we added to it. Are there any other alpha signals that could help us yield even further returns from that commodity complex? Because you can benefit from all types of skews and styles, so at the end of the paper that we wrote we actually tried to see what would happen if we add styles, like trends, and carry, skewness, and seasonality and the like, to this complex? Are you guys seeing the screen yet?

Mike: **01:02:16** Not yet, but we've said that hetero word so much I can barely see my own microphone.

Adam: **01:02:26** Mission accomplished.

The 'Combo' Approach

Rodrigo: **01:02:26** If you guys recall what you end up getting from the traditional energy weighted indices is basically a squiggly line that annualized, once you add the Rebalancing Premium you get 2% or 3% excess returns. Once you start looking at trend, skewness, seasonality, and value they all added value at different times. The combination here shows for those listeners we go from zero to the Rebalancing Premium approach adding 2% or 3% to the 'Combo Approach' of using all of these Tilts adding 7%. Adam, I believe this is Long Flat, right?

Adam: **01:03:09** Correct.

Rodrigo: **01:03:10** So, it's still the idea of being 'long commodities' at all times, but having the weighted scheme be 'tilted' more towards some characteristics and styles at different times that can help us capture a bit more of that yield that everybody wants; anyway, bringing it full circle there.

Adam: **01:03:28** No, that's great and you know what is amazing is this is ignored, right? Everyone talks about sort of trend, but how many people are talking about commodity seasonality as a strategy that they are trying to allocate to. Some people are talking about carry etcetera, value, but when you put them altogether it really is remarkable, you've got this long only exposure to an asset class that is really one of the only ways you can get production from certain types of inflation, and you're able to pretty profoundly increase the expected performance from this through proper diversification and 'tilting' towards very intuitive styles.

It's very cool and if we can really geek out for a second, one of the other interesting things that we sort of noticed about commodities is they have extremely high information content, like the 'Fractal Entropy' for example for commodities is just extraordinarily high. There is just a lot of independent dynamics operating on each commodity complex. There are a lot of different actors acting for different reasons and it drives the information content of these commodity indices to be very high and high information content is the holy grail for machine learning.

There is a lot of information density to learn from. Now contrast that to stuff like bond markets, like think of the type of equity return that has the least information density - it's a straight line up. There is zero information density in a market that delivers a straight line up.

Richard: **01:05:09** And one marginal buyer.

Adam: **01:05:10** Sure yeah.

Rodrigo: **01:05:12** Major moves are done by policy.

Adam: **01:05:18** Yeah, so like bonds. Bonds have very low information density, they're kind of as close to a straight line as you can get, certainly over the modern era. Commodities have enormous information density, and therefore they are extremely fruitful for machine learning approaches. Certainly, that is what we've found in our core alpha products, and I think that's extraordinarily interesting. I think that's one more reason why commodities are an interesting asset class and that fewer people should overlook them.

Richard: **01:05:49** I'll add another layer to this, which is the fact that because of recency bias and because we haven't seen inflation manifest in any meaningful way for the past few decades, everyone is under allocated to commodities, and it adds this potential for incremental dollars flowing towards the asset class, having a meaningful impact into that direction.

So, just this pop in expectation has been enough to see double-digit rises last year in 2020 across the board, particularly in grains and metals and now in the last six months, I would add energies to that. So, I'm still not convinced whether this is going to be transient or transitory if you want to call it Rod, or inflation or if it's going to follow through, but the fact of the matter is the market is now pricing this as a real possibility. How does one position for this?

Positioning Portfolios

Adam **01:06:50** So, we're in a position right now because the market cap of investible commodities is so small, the price elasticity of demand is extremely high right, so you have a major potential increase or decrease in prices as a function of relatively small increases in supply and demand for commodities themselves.

Mike 1:07:09 Nothing gets anyone one negative on oil than minus $37 oil or whatever it was.

Richard: **01:07:16** But oil is funny also because of OPEC.

Mike: **01:07:23** It's not just oil, the point was there was a massive demand shock in 2020 that caused down-stream decisions that are actually a little bit longer-term than one might think, but in particular in the energy space. When you close certain valves, they are just closed. You don't reopen them. They're just done, they didn't have any place to put whatever product they were producing. This is quintessential, "nothing solves either low or high commodity prices like low or high commodity prices". You need to step ahead by 1 ½ derivates of thinking what is obvious in the market are the expectations, the expectations are priced-in. What you're trying to figure out is what is the change in expectation?

Richard: **01:08:18** What are they moving more towards?

Mike: **01:08:20** How is that going to be meaningful? That is where the price shock or change occurs.

Richard: **01:08:27** It's funny how we mis-remember, I don't think a lot of people remember what happened. I think it was March 9th when Saudi Arabia came out and saw the opportunity to kind of, if not ruin, at least knee-cap the U.S. shale industry by opening up the floodgates, and that's what actually drove crude-oil all the way down. The energy complex is particularly interesting and complex and multi-dimensional because you are at the mercy of this cartel of countries.

Mike: **01:09:01** Richard the idiosyncratic nature, because I didn't want to say the other word. I can't say the other word again, but each particular set of circumstances around the commodity with which is being discussed, targeted, however you want to talk about that, that is the beauty of the commodity complex, that's it.

Richard: **01:09:28** I was going to say because the public indices are also meaningfully correlated to oil because it represents such a big weight, they are much more at the mercy of this particular idiosyncratic risk and this particular dynamic of those countries that make up OPEC as opposed to a more diversified risk balance.

Mike:**01:10:01** They don't get the diversity. When you put 60 or 80, I'm thinking risk weighted. It's probably 90% risk weighted towards energy. I'm going to guess, but maybe it's not that high, there is your bet that's the bet you have, that's the unique contributor to the portfolio.

Richard: **01:10:21** That's a really interesting question, I'd love to see that.

Mike: **01:10:22** You've added this one sort of bet but it's an energy bet. It's not a gold bet. It's not a debasement of fiat currency bet.

Rodrigo: **01:10:31** It's a single type of inflation hedge that is highly controlled by a handful of people around the world.

Mike **01:10:39** I would argue it is unique, like it is different.

Rodrigo: **01:10:41** It's unique but like every sector in the commodity complex is unique and has its unique players that drive the market and push in different directions. Here is what bothers me about this whole beta, getting exposure to beta, and commodities thing. Listen you should be more thoughtful how you hold your long positions in commodities, they're like 'I'm looking for a beta portfolio, I'd rather just do the commodity index.' The best performing commodity index has an active roll yield program underneath it, so it's all about that they recognize there is a structural benefit they can take, in order to be able to provide somewhat of a yield for the investor. So, if you take it to the level of 'what if we re-balance better and give you that yield' it starts becoming more like that's active. If we take it all the way to trend, and long only trend because if you want it as an inflation hedge you want to have the long position, you don't want to be caught on a 'Big Short' at the wrong time.

So, you have you're long only with 'tilts', that provides a massive benefit, much better than the roll yield, well people start getting jittery about whether that is true beta or passive, right? I don't know, you are doing it anyway at a smaller degree, you might as well go all the way with this long only beta.

Mike: **01:12:05** No, great Rodrigo if you're going to make the foray, one reason is size. So, if I don't have size and I have to allocate passively, I'm getting sort of a bet. I'm just going through it in my mind okay.

Rodrigo: **01:12:22** Yeah, if you're the Abu Dhabi Pension Plan, you can get off the line now. This isn't for you.

Adam: **01:12:26** Mike, what you're saying is, if you are not sufficient size then you kind of have to take what you get from ETF's right?

Mike: **01:12:38** Lower, if you're in the tails, correct. So if you're a small investor how would you create this Rebalanced Commodity Risk Premia? But again, I think that misses the opportunity to really fully integrate it. I know I get skewered for the integration side of it, but there is also a massive potential. The whole Rebalancing Premium of the 13 bets in the paper is about integration. It's about not separating into baskets of 'Oh, I have my bonds. I have my commodities. I have my stocks and I'm going to be in these three buckets'. No, no, there's an integration factor that happens between the three buckets.

Adam: **01:13:16** I think you need to get mad about the popular risk parity products. What is it about them that really makes you mad, let's hear it?

Mike: **01:13:25** That triggers me?

Adam: **01:13:25** Yeah.

Mike: **01:13:26** You mean Leveraged Stock/Bond Portfolios with a smidgen of …?

Adam: **01:13:30** Well, that's a whole other level but I mean, just in the portfolio construction of the really popular, and I don't want to name the popular one.

Mike: **01:13:38** No, we won't name them. Largely they're 40/40/20, they're 40 stocks, 40 bonds, and 20 commodities, and the reason they are 20 commodities is they can't get to a full third, and they don't integrate. These are siloed buckets that are viewed outside the pervue of what potentially could be their integration. When you think about their integration, I don't know, there is soy bean oil, there's beans, there's meal.

That complex maybe going through something that's quite complementary to the overall portfolio, or should maybe more dominate the commodity portfolio or should be re-balanced back to the within the context of the entire portfolio. But when you silo these things, you're just giving that up and saying 'I don't know I can't do that', and then when you say 'I'm 40/40/20', which again, speaks to recency bias, speaks to over-confidence so there are people that like Risk Parity and they may like Risk Parity for the wrong reasons, because it's actually kept up.

Well, it's kept up because it's 80% financials, half of which is stocks, half of which is bonds and 20% commodities. That's been a great place to be, that may not be a great to be as we march forward in meaningful times frames. Like, a 10-year time frame, is really not a meaningful time frame. These regime shifts last 10-years. I mean I remember when everyone was so hot on the NASDAQ like we are today. I get it, the year ended in '99. It was a great 15-years for NASDAQ stocks - not at all.

And there are lots of differences between then and now and I don't want to say it's a bubble, it's not like that at all. It's not what I'm saying, it's interesting that people's sort of receptivity for certain asset classes is hugely influenced by the recency bias which then influences their overconfidence.

Rodrigo: **01:15:42** The commodities in the '70s were up 800%, gold was up 1400% right, commodities in our paper were up 0%. What was the years, from 1990 till now, so you're looking at 30-years where you annualized at zero. It doesn't always have to be that way, doesn't always happen that way, and in the meantime again, this is why you want to have a little bit of premia, of how you want to capture it, so you don't have to live through it necessarily as much.

It is interesting how for years we've been talking about this and it's only now after the 5-year break evens are going through the roof, they're like okay 'I'd like some of that now', after like energys are booming, like all of our PnL in our hedge funds just all of these commodities.

Richard: **01:16:32** Dominated by commodities, completely dominated.

Rodrigo: **01:16:34** Completely like softs, grains and what not.

Richard: **01:16:37** So, you raised a point on the Premium. Brian Moriarty asks a good question, "What is the best way to capture this Premium, this scheduled rebalance, or triggers at certain points, or portfolio percentages. So, whether the portfolio is drifting away from pre-determined weights, so that's something that we do cover.

Mike **01:16:53** That's proprietary, next question?

Adam: **01:16:56** What is interesting is the premia that we've been describing is captured through really simple time-based re-balancing, right? There are more complex ways of re-balancing, like re-balancing pair-wise, re-balancing as a function of different types of lead/lag oriented correlation metrics, and that sort of thing.

But you can capture a very substantial portion of the available re-balancing premium by just re-balancing in a daily time frame and maximizing the diversity of the portfolio, the heterogenicity of the portfolio and re-balancing with highly volatile assets.

Again, I can't hammer this home enough, commodities on their own are very volatile and they're very heterogeneous. These are extraordinary properties to generate a Rebalancing Premium and it just chronically gets overlooked and you don't get any Rebalancing Premium from any of the indices, and I think that's a real shame.

Richard: **01:18:08** Notice how we didn't even hang up 'Shannon's Demon' in all this because that's kind of the ultimate example, at least offline we tend to bring up as a sort of the perfect corollary to why this actually works.

Adam: **01:18:22** So,' Shannon's Demon' is really from information theory, it measures entropy and so goes back to the information content of the markets and the measure of the chaotic nature of the quantity, the chaotic information in markets. Again, commodities just have an enormous amount of fractal dimension and that fractal dimension allows you to rebalance at a variety of different frequencies and capture this extraordinarily large Rebalancing Premium. From what is ultimately just an obscenely naïve strategy, because maximized diversification, rebalance, like it's pretty remarkable that you are able to generate a premium that's that large from such a simple methodology.

Rodrigo: **01:19:10** Just because it's so interesting, I was just putting up some random commodities on the screen because you're used to seeing charts and you might see two lines that are very different from each other, like bonds and equities. Then you look at the equity composition and it's largely the same, I mean this is just gold, corn, platinum, silver, sugar, brent crude, they're all over the place. You don't see this level of heterogeneity anywhere else in the public markets anyway. Of course, again, who are we speaking to? We are speaking to the smaller players of course. You can't do this as a big institution, but if you can play in this field it's an amazing opportunity.

And Then There's Bitcoin

Adam: **01:19:56** Huge absolutely. Now why didn't you add Bitcoin to that chart? I don't understand we had this opportunity to-

Rodrigo: **01:20:02** That's right I forgot to talk about Bitcoin. So, when is Bitcoin a commodity?

Mike: **01:20:07** Well, it is a commodity contract.

Adam: **01:20:10** Well, you could just put for a stock …, $BTCUSD, just add it right to the chart, but I mean only say that because it is fun.

Richard: **01:20:16** Don't do it.

Adam: **01:20:20** Notwithstanding the whole Crypto angle thing.

Mike: **01:20:21** Hetero-crypto.

Adam: **01:20:25** Exactly, but it's a highly volatile market that is uncorrelated to all the other commodities and so it's literally adding a pure independent bet. Now you do have the challenge if you're going to allocate to it as a future, it's got a really negative roll yield, so you have to overcome that and I wouldn't advocate that.

Mike: **01:20:50** This is interesting because the roll yield is an interesting thing, both in Bitcoin and in bonds. I don't think people sort of understand how that works either, because I've had to many hetero drinks to try and explain it.

Adam **01:21:07** The idea here is right but with futures you've got spot futures or you've got front bond futures and you've got the back bond future and then there's often times depending on the contract, like maybe it's March, so we're soon going to be rolling into the April futures for many future's contracts. Maybe we'll roll into the April futures and we look at the May futures and the May futures are trading at a price that's below the April futures and therefore, what we'll expect is that the May futures are going to rise in price towards the April futures. So, it's that gravitational pull that gives you the roll yield and it's a real yield, it's like a yield on treasuries or what have you. So, carry, which is measured in this sort of roll yield, is what you expect in terms of return, if the price doesn't change. It's just like you are getting dragged up or dragged down towards spot.

Rodrigo: **01:22:22** The difference between spot and the contract you're looking at.

Adam: **01:22:30** Or front month and back month, exactly. So commodities, because they have this term structure in the futures markets, they have positive roll yield or negative roll yield, and it's an important component of commodity returns.

Richard: **01:22:44** And you can capture that positive roll yield depending on whether it's upward sloping or downward sloping, contango or backwardation, by going short when it's downward sloping. Is that right?

Adam: **01:22:57** Yeah, short negative expected carry markets and long positive, and that is the carry strategy on commodities that Rodrigo highlighted in the chart earlier, and there's obviously other terms that come into play.

Rodrigo: **01:23:14** Well, here's Bitcoin so whatever, you know it's all right.

Adam: **01:23:17** We're talking about the heterogeneity, not the trend.

Mike: **01:23:23** Not again. That's for the month of March.

Adam: **01:23:32** The growth rate of Bitcoin is 99M percent since inception or so. Was that the number he said today? I need to go check that.

Richard: **01:23:41** Well, it started around a couple of cents and it's at 56, 57,000 so I'm not surprised.

Adam: **01:23:50** I know you did that math in your head, I got it.

Richard: **01:23:54** I did, didn't I.

Mike: **01:23:53** There is the denominator effect again.

Rodrigo: **01:23:53** I was just going to say the thing about Bitcoin, because some people are asking whether Bitcoin should be considered a commodity. It's an inflation hedge, and I think the idea of Bitcoin as digital gold has merit to it for sure. I think it can be a store of value. I think the network effect has gotten to a point where it's going to be nearly impossible to kill it, but as Raoul likes to say which, I like his framework which that is a portion of it.

The other portion is, you're at a point of maximum ingenuity, maximum innovation, and that volatility is everybody coming to play in that field, to create a disruption. Fraud is here, success is there, we're going to find something over the next 10-years that is going to stabilize more toward that level of market cap and volatility that we see in gold, when everybody finally adopts it from a network effect prospectus.

So, today even if you put it in a portfolio, if you are looking at Rebalancing Premium and you're looking at volatility measures to make sure you are keeping it in line, it would be a very small portion of the portfolio regardless.

Adam: **01:25:05** Now, Jason Buck's going to be all over me to write a Crypto Rebalancing Premium Paper, I'm never going to hear the end of it.

Mike: **01:25:13** Well, that's going to be easy. 99% Bitcoin and re-balance the 1% in the S&P.

Adam: **01:25:19** No, I like a cross with like Litecoin, Ethereum…

Mike: **01:25:26** Come on you got to love the Dogecoin …

Richard: **01:25:31** The Doge-mites.

The Summary

Adam: **01:25:37** So, just to bring this whole thing full circle let me see if I can still summarize here. We talked about why inflation is capturing attention, how there is minimal emotional salience and sort of emotional urgency on inflation, because the vast majority of market participants have never experienced inflation first-hand. So, it's only sort of second-hand or allegorical that we think about the risk of inflation and so it helps to hear stories from those who have lived through inflationary episodes to make that more real. We talked about Rodrigo and Richard's direct experience with inflation in their home countries. Then we talked how to think about commodities as one potential hedge for inflation and some of the positive benefits for other hedges, like TIPS. We didn't really talk about real estate, but real estate has historically been a reasonable hedge for inflation and we've certainly seen a massive uptick in real-estate prices in many jurisdictions.

Then we talked about investable commodities and how many institutions are choosing to, at the margin, increase their allocation to commodities as an inflation hedge in recognition of the sort of modern monetary theory type policies that are coming down the pipe, and the potential risks introduced by that. The flaws and the typical indices that these institutions choose to invest in to hedge this risk, including primarily concentration and energies, and a lack of diversity and heterogeneity, and the potential Rebalancing Premium that you can get from a properly constructed commodity index that takes full advantage of this heterogeneity, and maximizes the long-term Rebalancing Premium.

Mike: **01:27:38** Mike is on the floor.

Adam: **01:27:41** … And how that Rebalancing Premium for commodities if done properly, can rival the long-term expected Risk Premium from equities and at the same level of risk, the expected Risk Premium from investing in fixed-income so, both the duration premium and the credit premium.

Mike: **01:28:02** It's more reliable.

Adam: **01:28:03** I don't know, I wouldn't be so confident that it's more reliable but it is definitely, the variation is due to different dynamics so you get the structural diversification and why you'd expect the commodity...

Mike: **01:28:18** Preciously.

Adam: **01:28:20** Which I think is beneficial.

Mike: **01:28:21** More reliable is, someone to look at it, like 20-years in the Equity Risk Premium that's pretty awesome, but what about the next 20-years where it's not reliable. If we were to look over time frames that people are most likely not going to look at, it's an inaccurate statement.

Rodrigo: **01:28:39** When you're averaging sometimes, you're going to be averaging 20 unique bets and sometimes you are just going to be averaging a handful. So, if you have a long period where these sectors are correlating to each other, that entropy necessarily to have that 'reliable rebalance' is not going to be there, but like every Risk Premium as you said Mike it ebbs and flows.

If there is going to be entropy and these long lived assets, if we're doing this not to trade something for the next month, quarter, year or two, if you're doing it for a portfolio that's going to be there for 30-years or 100-years if you're looking at your Legacy Portfolio, then yeah, I think it's reliable. To just wrap it up, is the styles that you can skew to as well on a long only portfolio that can increase that … for you as well?

I'll end it with, a lot of this content has been done in a more concise manner with the Master Class that we launched today. We went live with it on the *YouTube* Channel now. If anybody wants to do another two-hours of hearing Mike.

Mike: **01:29:51** It's going to be such a great weekend.

Rodrigo: **01:29:52** … You can go to *YouTube.* I think it's being pushed to most of the major players, it will take a while to update because we're updating our previous '12 days of Investment Wisdom Podcast' that was geared more to retail investors. This is more to individuals that have large pools of money that they need to manage for decades, 30 to 100 years.

Mike: **01:30:15** Well, you know you are going to experience all the economic regimes.

Rodrigo: **01:30:19** That's right, so take a listen and give us your feedback. A lot of this is covered there and yeah, reach out, Tweet at us, Like/Share, all of that fun stuff.

Adam: **01:30:32** You guys went way too easy on us today. I thought for sure we were going to get challenged.

Mike: **01:30:41** Leave me alone for about four or five hours, if you don't mind.

Rodrigo: **01:30:43** We were asked to say heteroscadacity five times.

Mike: **01:30:48** I love heteroscadacity, heteroscadacity, heteroscadacity, that's easy.

Adam: **01:30:56** Hetero-scadas-dicity. You missed a whole syllable.

Mike: **01:30:59** That's totally different. That's not what I was told. I just went with what I heard.

Rodrigo: **01:31:05** My Peruvian eyes only read ….

Adam: **01:31:08** It's transitory hetero-scadacity is what I think we're …

Richard: **01:31:12** We definitely should not have played that game.

Mike: **01:31:23** By the way I just want to do the shameless plug on the Re-Balancing Premium which is the White Paper and you don't even have to give up your email address we just give that away. That's like money laying on the sidewalk. If you would like our Optimal Commodities download then you are going to have to pay the huge price of your email address.

Adam: **01:31:48** Well, be running hard.

Mike **01:31:48** Just make up a fake email address so you can make the extra 4%.

Rodrigo: **01:31:55** Our head of marketing the background is banging her head against the wall.

Richard: **01:32:03** Can't wait to play against Mike tonight.

Mike: **01:32:06** Is it worth your email address to get an extra 4% a year? I don't know.

Adam: **01:32:10** No brainer in my opinion.

Rodrigo: **01:32:11** Oh, look at that, it's more worth to give the wrong email address for 4% a year, apparently.

Adam: **01:32:22** No one's got a hard question to ask, come on? You're 90 minutes in so I get it if you're brain is a little bit frazzled.

Mike: **01:32:33** I'm frazzled.

Adam: **01:32:35** I'm just getting started.

Mike: **01:32:37** I'm just thinking the guy who's listening right now what's his question?

Adam: **01:32:48** Yep, your right it was Rapid Dan.

Mike: **01:32:51** Oh, that's not even a guy, it's my mom.

Richard: **01:32:53** Yeah, let's wrap it there, about seven minutes ago.

Adam: **01:32:56** Exactly yeah. Thanks for listening guys.

Rodrigo: **01:32:59** Well, see you at poker tonight.

Adam: **01:33:02** Yep, that's right. Have a good night. Bye now.