Rodrigo:	**00:06**	Hello everyone and welcome to ReSolve's 12 Days of Investment Wisdom mini-series, where Michael Philbrick, Adam Butler, Jason Russell, and myself, Rodrigo Gordillo, will explore timeless evergreen principles that will help you and your clients achieve long-term investment success. From the importance of asset allocation, thoughtful portfolio construction, and maximum diversification, our aim is to offer you a comprehensive framework for a more thoughtful investment approach that may change the way you view the complex arena of investing altogether. We hope that you enjoy the series as much as we enjoyed putting it together.
Disclaimer:	**00:42**	Mike Philbrick, Adam Butler, Rodrigo Gordillo, and Jason Russell are principals at ReSolve Asset Management. Due to industry regulations they will not discuss any of ReSolve's funds on this podcast. All opinions expressed by the principals are solely their own opinion and do not express the opinion of ReSolve Asset Management. This podcast is for information purposes only and should not be relied upon as a basis for investment decisions. For more information visit investresolve.com
Mike:	**01:10**	Welcome back, and day three, think about the portfolio construction, why are there so many bets in the asset allocation space. Why we think this diversity should persist. And then how might we think about constructing that diversity in a very thoughtful and balanced way. And I will turn it over...
Adam:	**01:28**	So the way we think about diversity is in terms of what are the macroeconomic drivers that are influencing the returns, for the different asset classes. And we can break this total sum of economic environments down into four regimes by dividing them along the axis of inflation and growth. And so if you sorta think about, uh, typical two dimensional axis, you've got inflation going up and down, you've got growth going left to right. So the upper right hand quadrant you've got high growth and high inflation, so you've got an inflationary growth regime. Bottom right you've got a... a disinflationary growth regime. The top left you've got an inflationary stagnation, stagflation...
Rodrigo:	**02:12**	Lack of growth, low growth.
Adam:	**02:14**	... and negative growth surprising, yeah, surprises. And then the bottom left is, a deflationary bust. And there are fundamental reasons why different asset classes should rise and fall, thrive and fail in each of these different macroeconomic environments. And so if you think about, you know, what is fundamentally designed to do well during an inflationary growth environment. Well emerging market stocks, why? Because typically emerging markets are more likely to produce commodities. Commodities are also doing well in an inflationary growth environment. Real estate both domestic and global does well in that type of environment. What's an inflationary growth environment? Well think about through the 2000 to 2000 and mid 2008 period where you had a rise in real estate around the world. A big run in emerging markets and commodities.
Mike:	**03:05**	Like gold...
Adam:	**03:06**	Gold.
Rodrigo:	**03:07**	... And BRIC countries right?

Adam:	**03:08**	The BRICs exactly yeah.
Mike:	**03:09**	And this is where growth is just outstripping the rise in inflation, right. So the growth is sustainable, and it's causing further demand in commodities, it's just like a positive feedback loop.
Rodrigo:	**03:20**	Mm-hmm (affirmative)
Adam:	**03:22**	Yeah, we don't always see that during an inflation environment right?
Mike:	**03:24**	That's correct. So on the other side of that coin, if growth starts to fail or you just don't have growth while at the same time you're experiencing inflation, might that be wage inflation and what not then, we get in the period, like the 70's.
Rodrigo:	**03:38**	Mm-hmm (affirmative). Yeah, like look you have, uh, in the 70's you had stagflation right? A period where, this is what everybody fears today and has been fearing since 08. There's runway inflation and in pure runaway inflation you're gonna have high correlation between bonds and equities. You're gonna be in trouble and that's exactly what we saw in the 70's. We had a series of recessions while the U.S. dollar was getting pummeled. And inflation was runaway. And in a traditional portfolio, 60, 40 you wouldn't be able to do much. But once you start introducing asset classes like gold, commodities right? Where you're making 1400 percent returns in that same period where bonds and equites did zero. And 800 percent returns in, I think it's 1400 perfect for gold, 800 percent for a commodity basket. Clearly there's a place for that, for those asset classes. And today we have the benefit as well of TIPs. I mean talk about a more fundamental asset class that you can predictably say, "If we have runaway inflation, then TIPs are going to be offsetting that inflation."
Adam:	**04:35**	That's right. The government is covering that, that risk.
Rodrigo:	**04:39**	There is no... we can, we can, we can predictably say that in this type of environment these are the asset classes that are gonna thrive, what stuff is identifying what environment we're in at any given time.
Adam:	**04:48**	Exactly.
Rodrigo:	**04:49**	So two separate things but they're structurally designed to thrive in different environments. And then we have periods like 08.
Adam:	**04:54**	Yeah, where obviously it was deflationary bust. We've got a massive drop in inflation, the same time we have a huge kick in the teeth for growth. And stocks fall because they're a... they're sensitive to growth and what does well during deflation? Well bonds are fundamentally designed to do well during a deflationary environment and of course they did...
Mike:	**05:16**	Return of capital...
Adam:	**05:17**	Re- yeah becomes the priority.
Mike:	**05:18**	... not return on capital.
Rodrigo:	**05:19**	And if it's deflationary you've got cash being the best bet against that. So you have protection from cash. You have positive returns from treasuries...
Adam:	**05:25**	From duration.

Mike:	**05:28**	Yeah.
Rodrigo:	**05:29**	And then if you wanna include as an asset class, whatever the reserve currency at the time is, that's where safety goes, right? So money flows the whole way.
Mike:	**05:33**	I mean the whole point of deflation is, everything is getting cheaper.
Adam:	**05:36**	Mm-hmm (affirmative).
Mike:	**05:37**	And so if you can just preserve your purchasing power, you're actually winning. I mean that's one of the things in the Great Depression that was interesting is that deflation was rampant. And so if your portfolio actually treaded water... that was a huge a achievement...
Rodrigo:	**05:50**	You're hundred dollars would have bought a hell of a lot more later
Adam:	**05:51**	You're way ahead.
Mike:	**05:52**	That was a huge achievement.
Adam:	**05:53**	For sure.
Mike:	**05:54**	So just to summarize that, there's the structural relationships based on fundamental economic properties. I would also caution listeners that these relationships are obscured by noise on a daily and weekly fractal of time. But can very clearly observed on more quarterly, annually...
Rodrigo:	**06:15**	Yearly and even regime based right?
Mike:	**06:18**	... and sort of three to five year... correct. So just to caution you, it's a day to day thing that can be shrouded in noise. But just step back, look quarterly, look at yearly and they become much more obvious.
Rodrigo:	**06:27**	There's no shortage of people pointing out the fact that things can correlate all together, in a short period of time. Which is a 100 percent true but what we're discussing is the structural long- term relationship of these asset classes that you can see better overtime.
Adam:	**06:40**	In the end they are fundamental properties are what's gonna win out...
Mike:	**06:43**	Over the noise.
Adam:	**06:44**	... over the noise, exactly.
Rodrigo:	**06:47**	But the point of this is now we've basically identified, from a fundamental perspective, why it is that working in the arena of asset allocation provides us with higher breadth. We gave you the number and we identified the fact that in this arena of asset allocation you have a ton of diversification. Here's why. So we just explained why that is and why it's likely to continue to persist. Why we can depend on that over the next 100 years in the portfolio construction process. Okay so where-
Adam:	**07:12**	Because they're linked to fundamental properties of macroeconomics, right? So now you've got whatever 12, 13 major global asset classes. You've got everything from foreign and emerging bonds to diversify commodities and gold and stock

indexes from different regions. How do we put all these pieces together, right? I mean we want to create a diversified portfolio, how do we do that?

Mike: **07:38** Just equal weight it.

Rodrigo: **07:39** No, no, no, no market cap weight, everybody loves a good market cap weight.

Adam: **07:42** Sure.

Rodrigo: **07:43** The old Vogel approach.

Let's do that. What happens then?

Adam: **07:47** Well yeah, so lets... The thing about market cap weight is approximately 50-50 global stocks and global bonds. It's tough to figure out what the so called, I'm air quoting here but "market cap" of commodities or gold are. Is it based on throughput or is it based on total amount in storage. Not to get too far off topic there, lets just assume 50 percent stock, 50 percent bonds approximate global market portfolio.

Rodrigo: **08:10** And we'll link to, um, blog piece that, that actually walks through the Sharpe global market portfolio allocations. And if you wanna replicate this we actually show it there with, uh, with the holdings.

Adam: **08:22** So, um, yeah. I mean if you wanna create it you can create it but the reality is, just sorta thinking about it from the perspective of, how diverse is this portfolio that's got 50 percent global stocks and 50 percent global bonds. Well one of the missing pieces here in terms of constructing a diversified portfolio is that diversification is a combination of both diversity and balance. And the reality is that the global stock side of that 50- 50 portfolio is profoundly more volatile than the global bond side. And so the risk of that portfolio...

Rodrigo: **09:00** Quantify..

Adam: **09:02** ...is massively skewed to stocks. So to quantify it there's a few different ways to quantify it. One easy is let's regress the returns on that portfolio on the returns to just the stock side of the portfolio and you find that the stock side of the portfolio explains 90 percent plus of the total variability in returns over the time.

Rodrigo: **09:25** So, so let me, let me provide some context here. I think this is an easy example for people to wrap their minds around. So what this means, if we have some, two asset classes, bonds and equities, that.... where one dominates the risk of the portfolio right? 90 percent of the risk comes from equities. What that means over the next 10 days, let's assume that bonds make money for 10 consecutive days and equities lose money for 10 consecutive days in a 50-50 portfolio; nine out of those 10 days that portfolio would have lost money with equities, right?

Adam: **09:56** That's right.

Rodrigo: **09:57** And so that's a good way of understanding that-that-that the direction of that portfolio, the outcome will be nearly, wholly dependent on that equity side of the portfolio.

Adam: **10:09** Exactly. So let's just link it all together here, right. We can go right back to the beginning. So asset allocation is useful because you've got a wide variety of independent bets. Those independent bets are sustainable because they are directly linked to fundamental economic properties. And our objective should be to maximize diversification because diversification is directly linked to the breadth of a portfolio, the number of independent bets in the portfolio. And we care about that because a portfolio that has more independent bets, more diversification has a higher expected risk adjusted performance over time, right? So just sort of connecting all the dots here.

Mike: 10:55 Preach.

Rodrigo: 10:56 Amen.

Adam: 10:57 So how do we measure the number of independent bets or the amount of diversification in a portfolio. I mean we just talked about the fact that a 50-50 portfolio of stocks and bonds is 90 percent stock. Is it diversified? Well no, right? It's basically one bet, one point one bet some, it's just somehow... just call it one bet, right? So how can you take these 12 asset classes that have diverse correlation properties and create the most diversified portfolio. Well I mean, there's a way to quantify the amount of diversification in a portfolio, it's called a Diversification Ratio and you can actually maximize the Diversification Ratio. Lets take a simple example, you've got two equity indexes. Those equity indexes are essentially perfectly correlated. You hold both of those equity indexes in the portfolio and let’s say that both those equity indexes have an annualized volatility of 10 percent. But when you put them together in a portfolio 50-50, that portfolio has an expected annualized volatility of, you guessed it...

Mike 12:03 10 percent.

Adam: 12:04 ... 10 percent right? Now let’s assume you've got a, an equity index and a bond index, you're gonna hold them both in a portfolio so that they’re risk balanced. How many independent bets? Then they're, lets assume that they're uncorrelated. Well they're uncorrelated so there's now two independent bets. What is the volatility of that portfolio? It's seven percent, right?

Mike: 12:27 Right.

Adam: 12:28 And so the way we measure the diversification in a portfolio is you take the weighted average of the volatilities of the portfolio constituents. In this case you've got, two constituents each with their 50 percent weight. So the weighted average of those portfolio constituents is 10 percent. At the same time the portfolio volatility because the stocks and bonds are uncorrelated, is seven percent, so the Diversification Ratio is 10 over point seven. I'm gonna say that's one point four. So now you've got that diversification ratio is one point four. So now we're able to quantify, the amount of diversification in a portfolio and it allows us to use optimization to create a portfolio, let’s say of our 12 or 13 global asset classes that is maximally diversified by finding the weights that maximize that Diversification Ratio.

Rodrigo: 13:27 Yeah, well think about, just got back to that two asset class example. You said 50-50 right? That's an equal weight portfolio? I think …

Adam: 13:36 Yeah, but equal risk we're distributing equal risk. Yeah.

Rodrigo: 13:37 Just wanted to clear that up cause you can, you could have made the example of an equal weight portfolio, divided by an equal weight portfolio level. So it's the accounting for diversification on the denominator. And when you do an equal risk contribution that changes. Doing the global market portfolio and applying the,

		doing that math, you will get less independent bets from the global market that's dominated by equity risk. And using...
Adam:	**14:03**	Measurably, less diversity.
Rodrigo	**14:04**	... and using all those different asset classes than you would by making sure that the maniacs aren't taking over the asylum that you have equal risk contribution across each individual asset class through many methods of optimization we can get to that risk balance.
Adam:	**14:20**	Mm-hmm (affirmative)
Rodrigo:	**14:21**	That risk balance approach actually increases our, the amount of diversified bets using the same asset classes.
Adam:	**14:29**	Exactly, yeah. Depending on how you put the portfolio together, the weights of those assets in the portfolio will dictate how diversified that portfolio is.
Mike:	**14:38**	Right.
Adam:	**14:39**	And we can quantify that using the Diversification Ratio.
Mike:	**14:44**	So I just wanna jump in here folks.
Rodrigo:	**14:45**	Yeah.
Mike:	**14:46**	This is all written out in some of our pieces, so I think, where would we find some of that. So Skis and Bikes would have some of that math in it.
Adam:	**14:51**	There are really good simple examples in the Skis and Bikes paper. And then some of our recent articles on portfolio optimization. We really get into the nuts and bolts of this and highly recommend it for those who wanna go a bit deeper.
Mike:	**15:03**	That was heavy, it was awesome.
Adam:	**15:04**	Yeah, it was heavy.
Mike:	**15:08**	Just wanna give everybody chance that if you like that, go to the paper linked in the...
Rodrigo:	**15:12**	You just bring it all together so we have, going back to day two, we talked about skill multiplied by breadth. Breadth increases by being, by working in the asset allocation arena, asset class arena. That once we're in that arena, we can do better by simply being there in a global market portfolio weighting. And then we can improve that by weighting more efficiently by weighting them from risk quality perspective. And so that's one way of doing it, I know, in terms of diversification, in order to maximize, in order to optimize this. What are we measuring, what are the things we are measuring, right? We are measuring the correlations between these asset classes. We have to make some assumptions. So you can decide, you can have an heuristic and say like generally bonds and equities have x amount of correlation and so we're weight this based on this long-term estimates of correlation. And you're gonna get some improvement there than just doing a global market portfolio. But as we get more active and as we are able, if we have confidence and we have system that allows us to have confidence in estimates...

Adam:	**16:18**	We have portfolio agility too.
Rodrigo:	**16:21**	... portfolio agility, right? Allows us to maybe update our estimates of correlation as they change. Because we all know that that long-term correlation between bonds and equities, gold and equities and so on don't hold all the time.
Adam:	**16:33**	It's the joke about the economist, with his head in the f... in the oven and his feet in the freezer and on average he's just right. And we know that sometimes the correlation between stocks and bonds is positive, sometimes it's negative. And that will have a profound impact on the diversification properties of the portfolio if you're not changing that through time.
Mike:	**16:50**	Right. As an example, in the 1970s, we talked about earlier stocks and bonds had negative real rates of return and were correlated. The efficient frontier in that case is a straight line.
Rodrigo:	**17:00**	That's right.
Mike:	**17:03**	There is no diversification.
Rodrigo:	**17:04**	Right so if-if but-but...
Adam:	**17:07**	If you limit yourself to stocks and bonds.
Mike:	**17:09**	Correct.
Rodrigo:	**17:10**	If you're an individual that invests in these long-term assumptions and invests for a hundrd years and it's really for the next generation, then it's not that big a deal. You're gonna have a pretty poor period in the 70s, but you're gonna survive it. We have the ability to be agile we get paid to get better estimates. So if we can get better measures of correlation and update those measures as we go along, we are now even gonna be able to provide that excess diversification that excess breadth more consistently.
Adam:	**17:37**	Actually a good example of that is in the most recent article that we published on the force multiplier from diversification. We, we analyzed the number of independent bets based on the long-term average correlation estimates between the 48 different futures markets. But if you roll through time, because of the changing correlation estimates then the average of the rolling number of bets is very substantially larger than the number of independent bets that you get from just using different long-term averages. So, there are advantages to examining the current state of diversification and maximizing the number of independent bets as you go along, based on contemporaneous estimates as opposed to just using long-term estimates.
Rodrigo:	**18:33**	Alright so folks, that's what we wanted everybody to take away from here, from this right? Again focusing on the breadth side of the equation. What are steps that we can take on portfolio constriction perspective in order to push the boundaries of maximizing our diversification, maximizing our breadth. And we're gonna leave-
Adam:	**18:50**	And maximizing our expected risk adjusted performance.
Rodrigo:	**18:52**	Because of that. Because it acts as a force multiplier on your edge.
Adam:	**19:57**	Exactly.

Rodrigo:	**19:28**	Now that we have gotten there, we wanted to kinda keep it there. We want to keep it as simple as possible for this session on asset class and portfolio construction from a long only globally diversified portfolio. But in the next round, we're gonna talk a little bit about pushing that boundary even further using factors to create more breadth in the portfolio. Factor, sleeves and so on.
Adam:	**19:20**	And we'll talk about our popular bet with Warren Buffet.
Rodrigo:	**19:22**	Our Warren Buffet bet that was never...
Mike:	**19:24**	That was never... and he was so..
		Lets fact check that.(laughs)
Rodrigo:	**19:28**	He was so afraid, he just couldn't pull that trigger.
		He wouldn't even return our calls.
Mike:	**19:33**	He ignores bets he doesn't wanna take.
Rodrigo:	**19:39z**	Thank you for listening to our 12 days of Investment Wisdom mini-series. You will find all the information we highlighted in this episode in the show notes @investresolve.com/12 days. You can also learn more about ReSolve's approach to investing by going to our website and research blog at investresolve.com, where you will find over 200 articles that cover a wide array of important topics in the area of investing. We also encourage you to engage with the whole team on Twitter by searching the handle @investresolve and following Adam, Mike and myself. If you're really enjoying this series, please take the time to share us with your friends through email, social media, and if you really learned something new and believe that our series would be helpful to others, we would be incredibly grateful if you could leave us a review on iTunes. Thanks again and see you next time.