Adam: **00:00:59** Happy Friday folks.

David: **00:01:02** Happy Friday.

Adam: **00:01:04** Welcome too, David Blanchett and Michael Finke. Rodrigo, since you're such an expert at the disclaimer why don't you go ahead?

Rodrigo: **00:01:12** Well, that's right, the disclaimer. We are going to be talking about things that you shouldn't take, talk to your financial advisor or talk to a professional and then the scallywags that are just here to talk for informational purposes. With that, why don't we get everybody introduced?

Adam: **00:01:32** You need to work on that dude.

Rodrigo: **00:01:36** Listen, listen Philbrick will go on for five minutes, that's as much as we need. Guys, just don't do anything about that. That's going to be it for the disclaimer. I'm just going to say that.

Adam: **00:01:47** All right, sounds good. Okay, so David and Michael, David you start out if you don't mind? Just give us a little bit of background on your career trajectory and then Michael maybe when David's done? Just introduce yourself.

Backgrounder

David: **00:02:01** Sure. So real quick I'm David Blanchett, I'm the head of retirement research at PGIM. It's an asset manager owned by Prudential. Been at PGIM for about three months now, previous to that I was at Morningstar for about a decade. I research topics about retirement and hope to help people build strategies to implement them. So that's a hot take on me. Michael.

Adam: **00:02:26** You've been doing that for basically your entire time at Morningstar, that was your focus as well, right?

David: **00:02:31** Yeah. Before that I was at a company here. I live in Kentucky, doing that for about a decade as well. So I used to be a financial advisor going way back. So I've been in the game for a long time.

Adam: **00:02:44** Awesome, Michael?

Michael: **00:02:48** I am at the American College of Financial Services right now. Used to be at Texas Tech University. I have a background in both economics and finance. I used to be in applied economics and actually moved over into finance mid-career. Main interest is in personal finance type topics and really have been doing research and retirement income planning over the last decade or so.

Adam: **00:03:12** Fantastic. Yep. So the theme today is obviously retirement planning and we're going to be discussing the current state of the union in terms of maybe capital market expectations and what that implies about probability of success for different types of retirement approaches. And we also want to get into some of the more novel products that have become available, not in the US yet but there's a specific one in Canada that we want to dig into, *the Purpose Longevity Fund* that I know Michael, you and David have been spending some time recently really digging into. So maybe, I've actually read both David you and Michael have had articles in the last several months about the current state for capital market expectations. Whether we should or how we should modify the safe withdrawal rate assumptions, techniques for overcoming some of the low interest rate, high valuation issues that investors face. Maybe, David, I don't know if you want to start but how do you sort of see the retirement landscape right now in terms of what investors should expect maybe from capital markets and implications for traditional types of retirement planning?

The Current Retirement Landscape

David: **00:04:35** Sure. When it comes to doing any forecast, Michael is a huge fan of historical long term averages. I just can't seem to get him off of just using that 5% bond yield in projections. I don't know what it is. I think if you survey any professional asset manager that does any reasonable projection, either it's like super depressing or just moderate depressing. I think that it's really important when helping someone determine how much they have to save, how much they can spend, that you use realistic expectations. And, expectations today are a lot lower than they have been historically.

And that means lots of things. And I think that it's really important for folks who are retiring right now. There's obviously a lot more uncertainty for individuals who are further from retirement. But I think, the first thing is making sure you're using realistic assumptions in any projection. On top of that, by definition, if returns are lower you have to work longer, save more, spend less, or change your strategies. And one thing that we can obviously talk about today is the role of guaranteed income. I know that a lot of folks don't like to use the A-word, *annuity*, we can just call them guaranteed income. But I do think that now more than ever it's worth thinking about. It is going to be really hard to get a portfolio to generate income for say, 30 plus years if you've got yields that are 2% or less.

Adam: **00:05:54** Go ahead Michael. Love it.

Michael: **00:05:56** I just want to say it's important at the very start to say how depressing things are right now. And I know that David and I are very often buzz kills when it comes to discussions about what kind of a lifestyle you can actually lead in retirement. But let's just think about the 4% rule, what does the 4% rule mean? It means

that historically investors could have from a balanced portfolio, withdrawn 4% of the initial balance, increasing by the rate of inflation every year over some sort of a fixed horizon, say like 30 years. First of all, that 30-year time horizon is not realistic anymore for most healthy couples. So we've seen this improvement in longevity, especially among higher income Americans. I think this is something that a lot of people don't realize, the likelihood that of let's say a well-educated boomer couple that's around the same age, 65 years old right now, they've got somewhere between maybe a 45 and 50% chance that one of them is actually going to live beyond the age of 95. So that original conceptualization of what was a safe retirement length is now blown out of the water because you're going to have a lot of these people actually living beyond that.

And then when you think about what sort of a safe income, if you follow that 4% rule, what sort of a safe income could you derive from a safe bond portfolio? We can look at say, the TIPS yield curve, and we can withdraw that $40,000 of spending and then maintain that every year from a million-dollar portfolio. And at today's yield curve we're going to run out of money, let's say age 86-87 instead of age 95 by following the 4% rule, investing in the safest bond assets, which means that if you're going to make it beyond the age of 95, you've got to get an equity risk premium. And if you look at the expectations of equity risk premiums right now, nobody knows what it is. But you can come up with a reasonable estimate based on valuations and we can argue about how predictable the 10-year case is, it's been pretty predictable recently, and we're looking at...if you look at the capital market expectations of BlackRock or JP Morgan, we're looking at maybe five or 6% nominal equity returns, maybe 3% real. And I think that's maybe being a little bit over optimistic, you're relying on much higher than 3% real returns, real equity risk premium, in order to generate that.

But not only that, you have to get it at the beginning of retirement when it matters the most, because you can get an equity risk premium over the course of a 30-year retirement. But if you get it too late, you're going to be out of money. So it's depressing and I don't think a lot of people understand how depressing reality is right now, because we have this sort of soft comfortable cocoon of historical asset returns that people plug into their Monte Carlo simulators and they come up with these very unrealistic estimates of a safe withdrawal rate from an investment portfolio, and then they look at some of these products that are built using financial assets that are priced today and they say, well, those products are too expensive. But that's reality. That's companies that actually have to go out there in the market and build financial products with bond like assets that are very expensive right now. They're not going to deliver the same kind of income that you could historically obtain from an investment portfolio when you had a very good reliable equity risk premium and real bond returns, which you don't have today.

Adam: **00:09:36**

You may be surprised to learn that you're actually some of the more optimistic guests we've had on in the last few weeks. We had Steve Keen on a couple of weeks ago and he's calling for the end of capitalism the next 10 years. So low equity risk premium is actually relatively on the optimistic side of the spectrum. Before we get into how to think about expectations, I'd like to dig into how you guys think about modeling retirement risk and longevity risk and how you're thinking that domain has evolved over time. I mean, you mentioned the 4% rule which I think goes back to Bengen, and Bengen obviously just did a rolling analysis of what you could have withdrawn ex post from an equity portfolio going back to whatever it was at the time, 1900 or 1926, and then determine that if you sort of just rolled it forward over time, that over no horizon did you run out of money over a 30-year period with a 4%? withdrawal rate, historically?

But obviously, we've evolved in terms of how we think about the modeling of sustainability in the probability distribution for safe withdrawal rates. Maybe one of you can sort of walk through what best practices are right now in that space?

Modeling Sustainability

David: **00:11:12**

Well, first off, I think the Bengen analysis was great. I think it was a great starting point for planners, households, whoever. I think that there's often a disconnect though between the tools that advisors use for clients and the tools that Michael and I can use for research purposes. Bengen used the probability of success. That was a good metric 25 plus years ago, but it's not necessarily a very good metric today. There's notable shortcomings, it's binary, either you succeed or you fail. It doesn't capture magnitude of failure. So I think that we've had a lot of research and guidance along the way. But I think about best practices, one, you've got to use realistic capital market assumptions. And then that cuts both ways. I think that we can all agree that returns are going to be lower than they have been historically for the next 10 years. I think there's a lot of ambiguity in what happens after that. I'm a huge fan of saying, you've got to use near term, lower expectations and maybe something different, longer term.

Now, you can think that we're trapped in a low interest rate environment forever, but when we talk to advisors about using returns, I think that you need to have returns that match your horizon. So if you've got a 50-year investment horizon, the first 10 years should be low, the last 40 years could be higher, you've got to balance that out. You got to incorporate things like fees and everything else and then it's about incorporating all the different nuances in terms of guaranteed income, what it means on outcomes. And so there isn't necessarily an easy answer for me to the question, because the stuff that I do for research is not the same stuff that a lot of advisors do when they're giving clients advice, and that's an important disconnect that I don't see any bridge anytime soon.

Michael: **00:13:01** The other thing that I think we struggle with a lot is that the historical data if you're using rolling periods, equities have been incredibly reliably mean reverting, and we struggle with whether or not to make equity returns IID or mean reverting. And if we make them mean reverting then...

David: **00:13:18** IID, that's a fancy word. What does that mean?

Michael: **00:13:21** That means that today's return has no impact on tomorrow's return. And historically what's happened with US equities is, you hear this thing that a lot of advisors say, which is you just got to wait it out, that in the long run equities are always going to outperform safer investments. That's hugely controversial in the economic community. It's happened in the United States; it's happened internationally but there's no guarantee that that's going to happen. And in fact, that shouldn't happen, because that would create these opportunities for market timing. If it is that reliable, then you should be basing your equity allocation based on valuations right now. You should be taking advantage of that. And when we run these simulations, if we incorporate mean reversion, in some cases things don't look that bad. Because if you have a bad period, you're going to have a good period coming up in the future, and that happens relatively reliably. But if that mean reversion goes away, then a lot of these simulations that ended up with positive conclusions wouldn't end up with positive conclusions.

If you have a 20 year period of underperformance in equities, then obviously, that's going to have a big impact on the sustainability of a retirement income portfolio. That's not built into the historical returns because they are mean reverting, but who knows what's going to happen in the future? I mean, in order for markets to be mean reverting, you really have to have a pretty sizable element of traders that are behavioral, and there's no guarantee that's going to happen in the future.

Adam: **00:14:50** Yeah, the mean reversion process too is so lengthy. I remember going back to 2010-ish, and running a comprehensive CAPE analysis using a wide variety of different metrics, the Q-ratio, the Schiller CAPE smoothed to a variety of different smoothing horizons from five years to 20 years, market cap to GDP, wide variety of different metrics. And my observation was that on average, the sort of mean reverting periodicity is on the order of 15 to 20 years. If I recall it was, I don't know, 17 years to be absurdly precise. But I remember reading a study by Michael Kitces about a decade ago where he demonstrated that 85% of the explanatory power of the success rate is a function of the returns you get in the first 15 years of retirement. Just the sequence of returns dynamic is such that, I think as you were suggesting earlier, that if you get really bad returns early on, you can't make up for that later. So if you've got this really long horizon mean reversion, and that mean reverting process, the periodicity is actually longer

than the period in which the returns matter most, then just how useful is it to add some autoregressive mean reverting term to the simulation.

David: **00:16:36** So, maybe I'll disagree with Michael here. I'm not that worried about the autocorrelation stuff because relatively few advisors are going to use the pure historical time series for projections. Normally what they do is they're going to *feet in*, it's going to assume that they it is IID, where you just put in a historical long term average standard deviation. So in that context, there isn't necessarily an implied or autocorrelation in most projections today, at least from my perspective.

Rodrigo: **00:17:05** Which already puts the estimate of what you do at a disadvantage. So if you have mean reversion and you plug it in you're going to get a better outcome. You're taking a more conservative approach by not doing IID?

David: **00:17:19** You are. If you're using historical long term averages in the sequence that they occurred, you're implicitly assuming one, that bond yields are around 5% or not, and you're also assuming that there's, that equities become effectively less risky over longer time horizons, they don't. And so I think that we've moved away from that. So you don't typically use historical returns in the sequence that they occurred, and I'd like to think that more advisors are using capital market assumptions, return estimates in a model versus pure historical, but it's hard to gauge that. I don't have a strong pulse on the assumptions that they use here, they're using claims today.

Rodrigo: **00:17:57** So I actually want to go back to what you meant, when you said you're using a certain level of tools that allow you to do a better job for the investor, and there's a big disconnect between what you're able to use and what the advisor is using. Number one, what are they generally using on average, and why is there that disconnect?

Disconnected Tools

David: **00:18:16** Well, I mean Michael, it's like our job to like write code and build fancy models and test stuff. That's not what advisors should be doing.

Adam: **00:18:28** Sounds dreamy.

David: **00:18:29** What's that?

Adam: **00:18:30** Sounds dreamy man.

David: **00:18:31** I know, it is. I love it. It's not what an advisor, that's not their technical competency, so they're going to rely upon a tool that's created by someone else

that is generalized. So there's only so many assumptions you can make available in a model. I don't know that they're going to even know to care about certain things. How much time do they want to spend thinking about capital market assumptions? In theory, there's what I would call “smart seeds”. The base assumptions of the model are realistic ones, but advisors like to get in there and attack. I think that the one thing that is important regardless is, again, going back to the outcomes metric. I think that the vast majority of Monte Carlo plans are going to use success rates or some variant as the outcomes metric. And that can be incredibly unreliable. You can just get the wrong answer flat out because it doesn't think about outcomes the way that an economist would be. Like utility, we're quantifying preferences and capturing the distribution and all that.

And so I think that there is this need for simplicity. I mean, you have to have the advisor understand, the advisor has to get the client to understand. I think there are different places that we can go as an industry to help advisors have better models that result in better advice.

Adam: **00:19:42**

I remember being an advisor many years ago and there was a planner, an expert planner at our firm and he had very sophisticated models, and we spent a lot of time discussing them and it turns out that he tried to encourage the advisors to use the robust comprehensive reports that came out of his more sophisticated modeling procedure. And what ended up happening is the advisors all rejected those reports because they were competing for business against other advisors who were using simple reports with linear expectations. So you've got sort of other advisors who are delivering a client an 80-page booklet with 60 pages of pro forma expected cash flows based on linear expectations out 50-60 years, and the numbers look really good. Because they're not accounting for the stochastic nature of the process. Clients don't understand it and in the end, clients want good news. And so if you got an advisor who's got a robust plan but the news is more challenging, versus another advisor, who's got a simple plan and the news is more encouraging, nine out of 10 times or some vast majority of times the client will choose to go with the advisor with a simple plan that has good news.

So this is a major obstacle. Do you have any thoughts on how advisors can overcome this in order to both be successful at winning business and do a prudent job for their clients?

Overcoming Prediction Obstacles

Michael: **00:21:34**

I'm on some of these retirement discussion boards on Facebook which I would recommend to anybody because it is so entertaining. There are constant discussions about how to choose a financial advisor and there are discussions where people will go to visit with a few different financial advisors and one will

say, well, you should expect somewhere between 8 to 10% return on your portfolio. And another one will say, well no, actually, it's more like five to six these days. And everybody says well go to the one that says eight because that's better.

David: **00:22:04** Hey, I'm going to give them 10 or 12.

Adam: **00:22:08** You laugh, but I have a quick anecdote. Mike and I, my business partner Mike and I attended an institutional workshop, and one of the presenters was the CIO of the largest municipal endowment in Canada, about $200 million endowment. And she presented a use case of where they had re-engineered their investment policy and had gone out with an RFP to nine different institutions for proposals on an investment portfolio to meet very specific objectives which was achieving 5% real, on their portfolio. And so they went out, they sourced managers by using the connections of their board members. So problem number one. But that's primarily how they sourced managers for the proposals. They got nine proposals back. Eight of the proposals came back and said, we cannot as fiduciaries give you a portfolio that we think can reliably produce 5% real, over your investment horizon. One came back and said, okay, yep, here's a portfolio that will produce 5% real. Guess what they did?

So it's not unique to retail. Even sophisticated institutional CIOs make exactly the same mistakes. People want to hear the news that they want to hear and in the end they're going to work with people that give them news they want to hear. So that is a massive challenge.

Rodrigo: **00:23:50** Meb Faber does this survey every year. Or maybe he highlights a survey where they ask what institutions believe the different sleeves of their portfolio are likely to do. And because a lot of these institutions are actively managing the equity and actively managing the bonds, actively choosing their hedge fund managers, the returns on the hedge funds is consistently expected to be 15% or more. So that hubris of yes, everybody else is going to receive 4% or two and a half percent on a balanced portfolio, but my team is going to be able to produce 8 percent annualized is I think the big issue with capital market assumption. Maybe not everybody's using it, but a large proportion are. That's the biggest input issue behind this whole retirement plan.

Adam: **00:24:37** Yeah. If you use more optimistic assumptions you're going to produce a more palatable plan. And if you're competing on the basis of whether or not you can do a good job for somebody as an advisor, it makes it very difficult for many, even sophisticated clients to be able to tell the difference between somebody making prudent assumptions and delivering a practical realistic plan, and some using optimistic assumptions with a linear modeling process and delivering just

absurdly optimistic assumptions. I don't know, maybe that's an insurmountable problem. Any thoughts?

Rodrigo: **00:25:20** Thinking about that. The thoughts on how to fix that, If you had the god of retirement and could force advisors to do a certain thing, what would you have them do for you?

David: **00:25:34** There's clearly a disincentive in this instance to doing what I think we would all agree is the right thing, to use more realistic assumptions. And I think one way to confront that would be to have a uniform set of assumptions that everyone has to use in a financial plan. Now, that would be impossible to get agreed upon, but I think that collectively, unless you did something like that, I don't know how you would force advisors to not want to use that 12% annual arithmetic average return on their financial plan, because it sure makes that outcome look great, doesn't it?

Michael: **00:26:09** I think we should also mention that this hasn't historically come back to bite advisors who have been over optimistic.

Adam: **00:26:19** Very fair point.

Michael: **00:26:20** But I think it's going to happen, that right now in the very beginning of the pure defined contribution era where all these boomers who are sitting on a ton of assets right now, they have an inflated expectation of how much income they can withdraw from those assets. But a lot of them don't, thankfully, for financial advisors, thankfully, they can tell them, they can withdraw this amount of money every year, but they don't do it, they just sit on it, which it works out for everybody because the adviser gets to manage more assets, the client doesn't run out. I mean, they're afraid of spending anything because they could run out, but they don't like spending down their corpus. And so in a very low interest rate environment, you got 60% of your investment say in bonds and then you've got equities that are maybe flat. In order to maintain the same lifestyle that you had before retirement, you're going to have to start spending money out of that portfolio. And the question becomes, are they actually confident enough that they're willing to spend down their portfolio, to see that nest egg gets smaller? Which I think is going to have to happen over the next decade, people are going to have to be comfortable with that idea, but historically they haven't done it.

I think in many, many cases it's the middle class that actually spends down their assets but a lot of people who are sitting on a ton of money, they don't run out in retirement. And that's a bit of a mystery. I think that that has saved a lot of financial advisors who perhaps have been overly optimistic, because their clients don't actually follow some of that overly optimistic advice. Now, if they did and

they started running out of money would that be a liability risk? That's an interesting question guys.

Rodrigo: **00:28:03** It seems to me that the biggest pinpoint or thing you point out is proper capital market assumptions. But if I go way back to when I started in the business, everybody did, a lot of advisors used a spreadsheet, linear assumptions in terms of the expected rate of return, 7% every single year, no volatility, you die at 87, and so this is how much you need to spend on a yearly basis. Now, I heard you say Monte Carlo a few times. So I'm imagining that from those days we've moved into some sort of stochastic approach where you're taking into account different distributions around I imagine returns, I imagine inflation, I imagine lifespan, what is being put into these models that advisors are using that may or may not be more robust in the spreadsheet example. I gave?

David: **00:28:53** It's not necessarily. And one of my favorite things I've ever seen is, I'm tempted to name the company, but I'm not going to as I have an account with them. And they have a cool online where you can do a 100,000 Monte Carlo simulation. I was like, oh my god, that is awesome. 100,000, total overkill, but I'm loving the size of that. But it uses pure historical long term averages. So I'm just like, this is garbage. This is like a huge number of runs, but it's absolute garbage.

Rodrigo: **00:29:31** What was the output on that? Monte Carlo…

David: **00:29:34** So it tells you like how the odds of you accomplishing a goal. We call it a stochastic model of Monte Carlo, there's only usually one random input. We only usually assume it's returns or inflation. That's usually it. I think that in reality to be truly stochastic. There's lots of other random things that can happen. Like when you retire, when you die, how much you spend, do you have a health shot? That is real life. Somehow implying that a Monte Carlo simulation for your life is just random returns, doesn't even nearly do justice to the possible array of outcomes that are out there. But that's what they're showing you. So to your point, what I'd rather you do a 100,000 run using historical long term averages or a pure deterministic 3% forecast, I'd pick the 3%. And so it gives you the capability of running a better plan but it's still garbage in garbage out. You could run a million Monte Carlo runs and still have a bad outcome.

Failure Rates

Michael: **00:30:33** David, talk a little bit about why failure rate is such a one dimensional outcome for these stochastic analyses, because it's really, do you make that lifestyle to a specific age or don't you. But there is no information about what happens if you fail to make it to a certain age, and there's no information about what happens if you live beyond that pre-specified age and outlive your savings at that point? So there is no nuance to how bad that outcome could be?

David: **00:31:07** Well, to be fair, you're talking about estimating success and failure rates using a point estimate across like, life expectancy. So I'm going to pick age 95 and estimate if I succeed or fail based upon that. You could actually do success rates and overlay mortality. You could say, I'm only going to assume that I failed if I'm still alive and I'm broke, okay. So no one does that. But you could. But even then, I think the larger issue is, it totally ignores that magnitude of failure. So let's just say that I take like one income for 30 years, and the 29th year, the 30th year I fall $1 Short. Like in your 100,000 run Monte Carlo simulation you failed, but you really didn't. There's no perspective on the magnitude, and that's really important because almost all retirees have some form of guaranteed income.

So like Bengen's analysis, it assumes like, Oh, my God, if you fail it's the end of the world, that's nuts. In reality, a lot of people can afford to cut back and take significant haircuts because they have lots of guaranteed income. They don't need the money as much. And so that's why Michael and I have redone the Bengen analysis using more forward looking return estimates. And we would say, if you replicate Bengen's assumptions, 3%-ish or less, there is the new 4%. But I still think that 4% is fine. 5% could be fine based upon the amount of guaranteed income you have, and you're willing to cut back. But we figure that out using utility models and different approaches versus that very basic idea of what do you need to have a good success rate?

Adam: **00:32:42** Okay, so walk us through that. This was going to be my next my next question.

David: **00:32:47** It's by my garage, I got like a hammer and a saw. So, that was a good joke, was like a dad joke. I'm not sure when it goes…

Rodrigo: **00:32:58** I love that, I'll be doing those all day.

Defining Utility

David: **00:33:02** So utility is just how economists quantify preferences. Like the example that I always give is let's say I could flip a coin, and you get a 50% raise, you get a 50% take back. On average, you make the same amount of money but no one would take that gamble because bad things hurt us more than good things. And so the goal with utility is to look across the outcomes and quantify each of them and then aggregate them together. So opposed to just saying, did you accomplish your goal, it's like, how much did you accomplish it? If you don't accomplish it how does that make you feel? It provides a better perspective on what is the true outcome versus again, just a success rate metric?

Adam: **00:33:43** But I think at least the way you're describing is like a multi objective optimization. So you've got some sort of Pareto frontier where you've got maybe the net present value of all distributions, you've got the probability of success,

you've got the expected terminal value of wealth. How do you bring those together as a single utility objective in order to...I mean, I'm sort of thinking about it from the ground up. The problem is, what portfolio can I assemble today given my capital market assumptions to maximize my utility in retirement? Which is a multi-dimensional problem. So how do you guys, and by the way our audience tends to skew technical, so feel free to dive in here to whatever extent you like, but how do you account for all the different dimensions of these objectives?

David: **00:34:46** It's not easy, right? I mean, usually when you use these utility functions you're focused on consumption, how much you can spend, and you could aggregate the quest and consumption. But really think about, you have a Monte Carlo forecast, you have an income amount every year and you have a number of runs. And so then you just say, hey, well, you can you can aggregate that income based upon its volatility and things like that. So I mean, I would say it's complex but it's not, it's really just saying, how do you feel about each of these outcomes and pulling it all together? Then, a key then is, are all the levers you have are going to affect your utility. So I can have a more aggressive portfolio, more conservative portfolio. I can spend more I can spend less, there's a variety of tradeoffs or levers you have to figure out. What is that truly best approach when it comes to each person?

Michael: **00:35:40** Adam, I think that recently the way David and I have been trying to conceptualize this is to simplify it as much as possible and ask, if you're going to spend the same amount of money every year in retirement, what combination of investments and products is going to allow you to spend the most optimally every year? So then we run a utility maximization and we say, if you chose this approach then how much could you spend every year in retirement optimally? If you chose this approach, how much could you spend optimally. To me that provides a much clearer outcome, and it actually matches the observed data of how people actually spend money. When they know for example that they have a greater base of guaranteed income, they tend to spend more in retirement. One of the reasons that they spend more is because the outcome of running out of money is not as bad.

So when David talks about utility, incorporating utility, just for example, let's say that you got a longevity annuity and you bought an annuity that kicks in at the age of 80 or age 85.

David: **00:36:41** Would that be a *kulak* Michael?

Michael: **00:36:44** I don't even want to get started on my love affair with the *kulak*. But just as an example, we can start thinking about what this utility analysis means. When we hit age 85 we're going to get an income of say, $20,000 a year on top of Social

Security, which is already inflation adjusted. And if we run out of money and then at the age of 93, the outcome is not that bad, we've actually got a pretty soft landing. We have a safety net. Now, if you did not buy the *kulak*, you then would have to live on Social Security. It would be a much harder landing. So optimally what that means is you can spend more every year between now and whenever you run out of money. You can live better because you've got a safety net. And we can incorporate a lot of different types of product designs to estimate what is the design that's going to allow you to optimally spend the most, using that utility function as the objective.

Adam: **00:37: 37** So you say what allows you to spend the most you mean subject to a minimum probability of success or something?

Michael: **00:37:51** No, no probability of success.

Adam: **00:37:54** Hold on. So then what do you mean by optimal spending rate then? Define that for me if there's no probability of success constraint.

Michael: **00:38:05** What you're doing is first of all, you're assuming that you're going to have a fixed rate of spending up to the point where you run out, and then you're going to have to spend less.

David: **00:38:14** You don't have to do that, you can actually model… And then you can look at different product approaches. You can incorporate a utility function which tries to account for the amount of unhappiness that you would experience if you went from spending $60,000 a year down to $25,000 of social security and you can choose a spending level that is going to provide you with the greatest amount of lifetime happiness with different types of combinations of investments and say, risk protection products. And that'll give you a much clearer idea of what's going to allow you to optimally spend more.

David: **00:38:52** Let me give an example. So the unit of utility is *utils*, isn't this fun? So let's just say you have like two possible outcomes. You have, I get $20,000 a year and I get one util for that. But if I get $30,000 a year I get 1.2 utils for that, whatever it is. So then you run a projection, you have one of the two, you pick the one that maximizes the average. So what you say is, well, I want to get $30,000 a year because I get more utility for that, but if I get down to 20, I get really upset. You test different combinations of maybe a product or a portfolio that determines the maximum of those two. So it's effectively a tradeoff. So you want to get the $30,000 a year but the benefit of that isn't as great as if you go down to $20,000. So the key is quantifying that combination by averaging out all the different possibilities. There is a success rate there.

Adam: **00:39:47** Okay. It ends up being the same basic utility frame as a mean variance optimization, but essentially you're using the IRR of cash flows divided by the standard error of the IRR of cash flows and then sort of maximizing that objective?

David: **00:40:13** Well, there's lots of ways you can do it. We think about it, it's when bad things happen, how much do you penalize that? So like downside deviation you square. Super easy way to do the math. Well, what if you cubed it, or what have you *quinted* it?

Adam: **00:40:34** You're dealing with highly nonlinear utility functions?

David: **00:40:40** I have kinked utility functions, you can, but think of it. You could have a sliding scale where if you're just a little bit under the exponent is one, if you really under it's like five, then you got to pull it all back together. So it's focused usually more on the on the cash flows. What is the amount, you then aggregate back together, using, there's simple ways you can do.

Adam: **00:41:05** I like that but then how do you quantify the end client's true utility function. Obviously, we can construct a utility function in whatever shape you want but how do we map it to clients' true utility functions?

Mapping to Utility Function

David: **00:41:23** Well, let's say that the client's goal is to have income for life. And their question is, how much can I spend? I have this portfolio. So, we have to make assumptions about, one really important assumption is, how flexible are you in terms of retirement spending. If you've got a shortfall, how does that make you feel? And so then, given information like that for example, you can run the analysis and say, okay, well, if you have a shortfall, what is that exponent for your unhappiness?

Adam: **00:41:54** What would you say your exponent for unhappiness of a shortfall below a certain threshold would be?

David: **00:42:00** That's really a personal question. A good point about that is, like is the role of guaranteed income. Because the more of that you have, the less that you're going to be affected by bad things happening. That's what you're doing with that kind of analysis, you're saying, okay, given for example your risk aversion for a bad outcome, this is what you should do. So if you tell me, I'm kind of okay with cutting back, we're going to tell you that you can spend more, or you can use these models and these methods to quantify things in a way that is a lot better than kind of the success based approach.

Michael: **00:42:33** I guess Adam, the easy answer to that is, we're just using the same relative risk aversion as we use during the accumulation stage. So if you can elicit relative risk aversion from a client before retirement, you can theoretically then apply the same level of risk aversion after retirement. But risk aversion in essence means a different thing. It means your willingness to accept variation in your lifestyle in retirement. That's the retirement definition of risk aversion, but it is the same concept.

Rodrigo: **00:43:04** So really, the guaranteed income side of it is crucial here unless there is someone out there that is happy to get, what do you get in the US for a guaranteed income from the government?

David: **00:43:18** Social Security.

Rodrigo: **00:43:18** That Social Security, right? So that is the base level of what anybody might want if they don't want to buy extra guaranteed income. And then there's a shortfall between I want to spend this much and then if something bad happens you go straight down to the $10,000 a year. How good are you with that? If they're good, then you should spend that amount. So it's a simple heuristic, kind of does it require a lot of modeling and a lot of fancy modeling for this or is it…

David: **00:43:47** You want to get most of the way there, ask someone, ask how much you need in retirement, and then cover that with guaranteed income. Because that's actually what your proxy is. If you say, oh I only need $40,000 a year, what are you getting from guaranteed income? Oh, I'm getting 45, you're probably fine. The issue really becomes for wealthier households who get less and less of their income from Social Security, that have a growing gap, where they say, I really need $100,000 a year, you only get $30,000 from Social Security, then there's a huge possibility there for the negative outcome which is not covering that kind of minimum level of consumption that you're talking.

Adam: **00:44:27** Okay. So, you mentioned earlier that annuities...

David: **00:44:33** We're going to talk about it. What do you do when you say the A-word?

TIPS Ladders vs Annuities

Adam: **00:44:37** May close this gap. So let's go there. I'm actually really keen to have this conversation because first of all, I want you if you don't mind to describe the difference between an individual buying a TIPS ladder and an individual buying an annuity and why an annuity is almost always preferable.

David: **00:45:01** Michael loves to talk about this. He's got the slides with these lines. Go Michael, go.

Michael: **00:45:07** Okay, so I think a better way to do this is to think about your kid having a birthday party. And you go to Costco and you buy one of those giant birthday cakes and your wife tells you that there's going to be somewhere between 15 and 40 kids showing up to eat the birthday cake. And they're going to come one at a time and you have to serve them a piece of cake one at a time. So what do you do? If you give each one of those kids one 40th of the cake, they're going to think you're a cheapskate, they're going to be unhappy. But if you start giving each one of those kids a big fat piece of cake and then the 25th kid walks through the front door and you got nothing left, kids number 25 through 40 are going to be really unhappy.

Adam: **00:46:01** That is such a great way to describe longevity risk. Okay, cool, that's perfect.

Michael: **00:46:09** But the idea is, if your wife could have said, there's going to be 25 kids coming, would you have been better off? Yes, because you would have known exactly how big to make each one of those pieces. Now, if you don't know, one of two things are going to happen. You're going to either make those slices too small and then you're going to end up with half of the cake and nobody to eat it and everybody's unhappy, or you cut off too much and the kids start coming in and they got no cake. So there's always a loss if you fail to annuitize. And that's why since the 1960s we...

David: **00:46:48** Unless you guess correctly.

Michael: **00:46:50** Unless you get correctly, which even if you guessed correctly the optimal slice is too small because you have to accept the possibility that you may not have guessed correctly. So the optimal slice is too small if you fail to annuitize.

Adam: **00:47:08** Okay hold on, I love this analogy but I do think it behooves you to draw a direct connection to how this applies to annuities and longevity risk.

Michael: **00:47:24** Let's say you're a 65 year old female who's in good health. And by the way, let's only look at the mortality table of people who actually look like our clients. Do not look at the Social Security mortality table because that's not relevant for most clients financial advisors. So you got a healthy 65-year-old female client, higher earner, she has about a 50% chance of living to the age of 90. So let's say 60% of your portfolio is in bonds, with that bond portfolio, do you slice it up in equal parts? Is that ladder going to last you to the age of 90? No, because there's a 50% chance she's going to live longer than age of 90. So do you slice it up to 95? Well, there's still a 26.7% chance she's going to live beyond the age of 95. Do you slice it up so it lasts till age 100. But she's still got a 9% chance she's going to live beyond the age of 100. So you either have the cake sliced up all the way to age 100, at which point she's probably spending about 30% less each year.

And she still has to accept the possibility that she's going to run out. She still has a 9% failure rate.

So when you fail to annuitize, not only do you have to accept the risk of running out of money, but optimally you're going to spend less each year because you're going to build that ladder up to some age where the likelihood of failure is relatively low. And that's what's known as mortality credits. The difference between the size of the slice, the amount of money that you're going to spend each year if you build it to age 100, versus if you buy an annuity which is essentially like buying a ladder up to your expected longevity. David and I have done a lot of research on the pricing of income annuities and man, they are frighteningly price competitive. I mean, if you look at a bond ladder, like a treasury ladder and you look at the cost of building a treasury ladder to the age, the average longevity of a healthy American, you're actually getting a little bit of alpha on top of that plus you're getting the mortality credits because they're building in expectations of their general account portfolio of bonds, that's actually bigger that's higher than treasuries right now. So you're getting a credit risk premium and you're getting that mortality premium that you get from annuitizing. It is so a no brainer that it's not even a contest when it comes to maximizing utility.

Rodrigo: **00:49:51** Can you say that part again? So that extra credit comes from what? For the annuity structure.

Michael: **00:49:58** The insurance company when they build it, if you think about what they're taking into account when they price the annuity, they're looking at the probability that people are going to be alive to a given age, and then they're essentially multiplying that probability by the present value of buying a zero, to that age. So you can then estimate the present value of all those mortality's weighted payments. And if you do that, you find that it's essentially the same as building a bond ladder up to the expected longevity, maybe even minus a year or two if we're using treasuries. So what's happening is the insurance companies are assuming a credit risk premium and they're giving it to you for free, which is nuts. I mean, it is crazy but that's what's happening in today's annuity market, they're assuming that they're going to get a credit risk premium and they're taking all that risk and bearing it themselves. And you're getting the benefit of insurance on top of a guaranteed credit risk premium.

David: **00:50:57** But Michael, there's no such thing as a free cake.

Michael: **00:51:00** Well, there is a possibility that these insurance companies could go out of business if they promise a credit risk premium and they fail.

Adam: **00:51:07** That's it. That's the first red flag there. They're doing a dumb thing and we should take advantage of it assuming that they're going to get bailed out when the shit hits the fan.

Michael: **00:51:20** This is obvious I think that those of us who are trained in finance. This is a free lunch and it should not exist, yet it does. Now the argument is that there are these state guarantee associations that serve as a backstop. But when you talk about a systemic risk, the risk of failing to achieve a credit risk premium is probably going to occur to a large number of insurers at the same time. Now, I'm not so worried about a lot of the highly rated insurance companies. What I think is concerning to David and I is that increasingly what's happening is companies are coming into the insurance space and they're leveraging up the risk of some of these portfolios. They're providing higher and higher credit risk premiums that are guaranteed but the downside then falls on the rest of the industry. So that's optimal from their perspective and you as a consumer, especially if you're investing in short term insurance type products, then that can seem appealing, but investing in something that's guaranteeing a payment 30 or 35 years down the road doesn't sound quite as good.

Rodrigo: **00:52:23** So the hubris of excess returns is insidious. It even exists within the insurance companies. It's not just advisors or institutions. I want to make sure that I can use this analogy appropriately about the cake. So you have a cake, it's going to be 15 to 40 people and the baker says to you, here, you can have this cake, and by the way if you run out of slices I can probably give you one slice at a time but it's going to be very thin after you run out of that cake. So that's your guarantee, the baker is there on call with the slices that he's going to give you after you run out of the original cake, is going to be very tiny. So the mother that has a party says I'm going to guesstimate between 15, 30, 45. I'm going to guess there's 30 people and I'm going to slice up 30 slices. She gets it wrong, runs to the baker to get smaller slices. That's the insurance. That's the guarantee.

Contingent Deferred Annuities

Michael: **00:53:22** That's right. So essentially now, where it gets really interesting is let's say you buy a deferred income annuity, and it kicks in at the age of 80 or 85. But you have an investment portfolio of stocks and bonds that if you get a big risk premium you're going to be more than fine. That deferred annuity kicks in at age 85 and it's like you've had the party, only 15 kids came, you've got lots of cake leftover and then someone comes back by with a new cake. You don't need it. Wouldn't a perfect type of annuity be one that only kicks in if you run out of cake. So then you have an agreement with the baker. All right, I'll pay you a little more for the cake but if too many people show up, you got to come with a new cake and then start serving from that one. That's what's known as a *contingent deferred annuity*. And that is really the most efficient form of annuitization. It's

one that only springs if you absolutely need it. And then we're talking you can spend significantly more because you're not wasting money on deferred income annuities that you don't actually need.

Adam: **00:54:35** So how does that work? What's the specific conditions of the contract for a contingent deferred annuity? How does it kick in?

David: **00:54:49** They exist today, that's what a DOWD is. You have a variable annuity at an insurance company and you're paying a 1% fee where if that goes to zero then you start getting a paycheck for life.

Adam: **00:55:06** Okay, is that the structure that Michael, you are proposing? Because I kind of got the sense that you were able to sort of have this this pool of assets that you're managing personally, maybe whatever allocated to balanced portfolio or stocks or whatever. And you've also got this contingent deferred annuity that if your wealth falls below a certain level or something like that then this annuity kicks in and makes up the difference. But I could have been miss-perceiving that.

Michael: **00:55:37** No, you got it exactly. Now, if I'm the insurance company, do I want to manage the portfolio or do I want to let you manage the portfolio however you want? What is the optimal way for me to manage my portfolio if I know that the insurance company is going to step in if I run out? Well, you're definitely maximizing that risk. So if you want to maximize the value of that contract, you're going to take as much risk as possible. So it may be more efficient for the insurance company then to at least have some control over the investment portfolio. And then what they'll do is they, and this is a big issue I think with a lot of the ways that some of these products are characterized. So you're paying say, 1% per year to provide that protection if your portfolio runs out. That's not a fee. So if you go to some of these *I hate annuities* kind of documents, what you'll see is that 1% will be portrayed as a fee. It is not a fee. It's what you're paying for the cost of insurance and if you're managing those assets and charging AUM and you're charging the same amount of money but you're not providing that guarantee, then you're not providing anywhere near the amount of value that that guarantee provides.

So that money then it's invested, but it's also used to buy options. So credit swaps or some put options to protect that portfolio so that the insurance company will do really well if the portfolio, the investment portfolio sinks so that they can have enough money then to provide that guarantee, because it is going to occur to a lot of annuitants at the exact same time.

David: **00:57:22** Yeah, how it gets managed differs, but I think that in the past what we've seen is that these structures have existed solely inside annuities. I think the point that Michael's making, you guys are alluding to is, I think we're going to see more of

these wrappers on regular portfolios. You're going to kind of move beyond that annuity chassis and you're going to be able to see these types of strategies that are more easily to deploy on an advisors book of business.

The Longevity Fund

Adam: **00:57:48** Okay, so that's a natural segue for us to lean into this new product that I know you guys have been evaluating and we've been getting a lot of inquiries about as well, this Longevity Fund. This *Purpose Longevity Fund* which is some combination of an annuity, a tontine and like a balanced portfolio. But, maybe one of you guys try to describe what's going on here, maybe characterize it and the role it might play in portfolios, the relative pros and cons. What do you guys think about this now?

David: **00:58:27** I'll go and then we'll just let Michael correct me when I get anything wrong. It's effectively a tontine. Tontine is a word that describes a different type of risk pooling. So when it comes to annuities, traditionally, there is some possibility for individuals taking on market risk. There's immediate variable annuities, not a whole lot of those out there. There are these variable annuities. But the other day the insurance company is still kind of backing up, this is how things are going to go. There's an emerging, these were around hundreds of years ago where there's effectively more sharing involved. There's not only sharing of the investment risk, there's also sharing of the mortality assumptions. And so you're going from an environment where if you buy like an immediate annuity, a fixed immediate annuity, you get guaranteed income for life from the insurance company. If the insurance company gets it wrong, they're on the hook. If people live a lot longer then they are in trouble.

And these structures, these tontine-like environments, you're sharing the risks of this pool. And so if everyone in that risk lives longer than expected, your payment goes down. The investments do better, they go up, but I perceive it as, it requires more flexibility on behalf of the individual because there's less certainty in terms of the amount of the income, but it's far more efficient because they often have the same kind of reserving requirements you do for traditional annuities, just based upon the outcome of that pool.

Rodrigo: **00:59:57** So can I just say, you said that you're able to pool both longevity risk and the portfolio risk. I don't see how, maybe explain to me why they're also spreading out the portfolio risk?

David: **01:00:08** Well, the group suffers the gains and losses together. So I'm thinking about the outcome from the individual investor's perspective. So if the portfolio doesn't achieve, whatever the returns are, if it's negative, your income goes down. So I'm looking this perspective of, if I'm buying this product, what is going to affect

my income amount? If I buy a single premium immediate annuity, I'm in theory locked in for life ignoring the whole like insurance blowing up thing. In this type of environment my income is affected both by the market environment as well as the mortality experience of that pool.

Rodrigo: **01:00:50** You can pay against the annuity in terms of the investment, I was thinking about managing your own portfolio versus same portfolio, you can do it yourself, you can pool it. The only thing you're getting from the tontine structure is the pooling of longevity risk if you are, your only other option is to do a similar 60-40 portfolio.

David: **01:01:06** Yeah, I'm thinking more long, I'm comparing them against the really traditional equity versus a regular portfolio.

Adam: **01:01:18** So maybe flesh out what the potential advantage is. I hear you say we're pooling mortality risk or we're pooling longevity risk, and maybe flesh that out what that means in practical terms. And what are the potential downsides of owning one of these structures?

Rodrigo: **01:01:38** Well, before you do that, can we start with making sure that we create how the cash flows work and what happens when somebody dies to what they get back, what they don't get back and then we can talk about the pros and cons.

How They Work

Michael: **01:01:53** So, I think it's first of all important to say that this whole concept exists already and has existed for 70 years. So Robert Greenall created the first variable annuity as exactly this type of structure for TIAA Cref. And what it does is, it invests in a portfolio of stocks and bonds, and they estimate how long the pool is going to live, and then they adjust the amount of income they get every year. And the advantage of the variable annuity is the equity risk premium component. That's really the only advantage over a conventional participating income annuity. So with the participating income annuity which exists also among mutuals, you can vary the dividend every year depending on the performance of the bond portfolio versus expectations and the performance of mortality versus expectations, which I like a lot. Even though it's risk sharing between the individual and the institution, I like it because if the institution gets it wrong, then they're not going to go out of business. So that aspect I think is appealing.

Now, with a variable annuity, they are investing in a portfolio. It's only going to provide a higher income than in a traditional income annuity if you get an equity risk premium. If you don't get an equity risk premium, it can be worse. Now, when you start incorporating things like liquidity or access with a, with a TIAA Cref product, it is irrevocable. So you are buying into an income and the

objective of that savings should be income in retirement. Which is the way the 401k system should work. Like the government is paying $150 billion per year to subsidize this system and it's not paying that money so that you can pass the money on to your kids. It's paying that money so that you can live better in retirement. And you can either choose to live the same every year and get a fixed income annuity, or you can vary it every year by capturing some equity risk premium as part of a variable income annuity. And that product, even there's historical performance of that product, it's performed really well, pretty much exactly as would have been expected. The original design was, really motivated by the desire to make sure that that income keeps pace with inflation over time. Obviously equities don't correlate perfectly with inflation but generally speaking, historically at least in the United States it's been able to achieve that purpose.

Now, you can have additional designs that would provide, for example, access to a certain amount of liquidity but if you do that, that's going to have a negative impact on the amount of income that you can draw from it every year.

David: **01:04:36** So, the benefits outweigh the risks.

Michael: **01:04:38** Not necessarily. Alright, let's hear this.

David: **01:04:41** Well, if it increases the pool of individuals interested in buying the product. The question earlier about individuals don't like *life only* products, and so if you look at the mortality experience in different products, the optimal product is not necessarily life only, if individuals don't purchase it. So the goal should be to, to add individuals to whatever product you have to make it more representative of the US population. A problem with these new products that are created is if only like insanely healthy folks buy them, that's not a good pool to be a part.

Rodrigo: **01:05:13** Right. Because if you look at the mortality distribution, what you hope is to get that population distribution because what's happening is up until age 87, 50% of that population will die and therefore leave the money for the ones that are going to live longer. If the distribution skews to the right, then you're not getting the extra assets that'll help the longevity of the other side of the population. So what you want is more AUM per people, assuming everybody wants the same income in my little example, you want to be as large as possible with varied distribution of health outcomes, so that you can get as close as possible to something.

Adam: **01:06:04** There's diminishing marginal utility, like once you get a sufficiently representative population then adding extra people is of zero marginal benefit. So I take your point David but it's not...But most of the costs are fixed costs.

David: **01:06:21** It is a big deal because Michael's first love …, there's huge issues there with who buys them versus general population. So I get it, in theory when you get really big, but a lot of the products people that they love, aren't necessarily working as well as they could because individuals that buy them are disproportionately healthy. So it negatively affects the pool.

Adam: **01:06:44** Okay, fair enough.

David: **01:06:46** Keep going Mike, sorry.

Michael: **01:06:48** No, some actuary once told me that the only people who are buying longevity annuities are college professionals and actuaries and engineers, and that's not a very attractive mortality pool. And this is also an interesting aspect of different types of insurance products because they actually become more attractive to the insurer if you get a pool of less sophisticated buyers. So in other words, the TIAA Cref Variable Annuity may just be a bunch of college professors who like the idea of an annuity, that's not a very attractive pool. But if you're going to sell annuities to the steak dinner crowd, that might be a more attractive pool of annuitants and the insurance company might actually benefit from that. And you as an individual might actually, and this is where it starts getting really weird, because there are insurance products where they are less efficient from the economic aspect, from the way they're designed they're less efficient, but they actually pay more money. If you are a sophisticated person that buys an inefficient product, in some cases you can get a higher income than if you buy an efficient product because they're based on first of all, a mortality pool that is not as healthy, and second of all, on a group of buyers who are not necessarily sophisticated enough to use that insurance product optimally.

Rodrigo: **01:08:08** I just realized what company I'm going to launch immediately. You scout out the mortality pool of every single insurance company and tontine structure, and make sure that you're maximizing that, and is anybody doing that?

David: **01:08:23** I don't know how that gets reported.

Adam: **01:08:26** Okay, so let's carry on with...Let's keep on the topic of exactly how this this specific product works, An investor, a retiree or a pre-right retiree purchases this fund. There's different classes of fund depending on your age.

David: **01:08:55** We can go vintages.

How the Funds Really Work

Adam: **01:08:57** Yeah, different vintages. So walk us through that. You choose your vintage and then why is that important, and what are some of the restrictions on your capital

once you decide to invest because there is liquidity but there's penalties. So maybe if you guys are sufficiently familiar with it, maybe walk us through what that looks like.

David: **01:09:18** I am but I don't want to describe someone else's product incorrectly. So I was able to talk to someone there a few days ago but I'm worried about getting in too deep into the weeds and getting things wrong. So I might pass and say I reached my depth to this point.

Michael: **01:09:37** I can say hypothetically David, if you were going to design a product which is essentially a mutual fund type of product that incorporates a longevity protection element into it, what would it look like? Obviously, you'd have to enter the vintages because you want to try to make sure that the mortality pool is relatively homogenous, otherwise there's going to be a big transfer among members of that pool.

David: **01:10:02** Well, then there's the risk of the intergenerational wealth transfer. If you get assumptions wrong early on for young people, then old people benefit and all that. I mean, you have to have some access, you have to have a market adjustment, you have to have some kind of return of premium provisions early. You asked what happens if I die? In theory, we should all just go out and buy annuities with no return or premium or cash refund. But that's just not how things are. So I think you've got to kind of check a variety of boxes to get folks interested in it, that aren't necessarily income maximizing but it maximizes the pool of folks that are actually willing to buy it.

Rodrigo: **01:10:36** So maybe I'll break down kind of the product because I've done some deep dives over the last week that this particular product tries to invest in a traditional pool, the portfolio doesn't change, you have different vintages and those vintages spit out different income. So different amounts of distribution on a yearly basis. So you don't get to choose your vintage there. Whatever your age bracket is you get that class of fund. You can also buy it before the decumulation phase, you can buy it in the accumulation phase. The accumulation phase you get to grow it with everybody else and you always are able to withdraw your money at NAV. After 65, you get to withdraw with the lesser of the money you put in minus your distributions, or the NAV. So the lesser of either. What that means is that you're basically, if you have your portfolio, your NAV accumulates a ton of excess returns outside of what you put in, minus your distribution when you die, if there's any left out that's not profit, your family can get it, but the profit stays within the fund. So the rest of the participants benefit from any profit that your portion created. If your distributions are lower than what you put in, you'll still get the income for life and benefit from that pooling of longevity that they're hoping grows over time, and if you have used all that up, then there's nothing for your family, there's nothing left for your family.

So you can get the liquidity whenever you want, but it's as long as there's anything left from your original distribution. So that's the structure as I understand it. And you had said on Twitter that this is optimal. And I'm just curious given … annuity. … It's Michael. I'm now confused, because like man, what you described earlier seems more optimal than this.

Michael: **01:12:39** Essentially what you're describing is a CDA. So it is that you're buying longevity protection from an investment portfolio. You have that portfolio, you're spending it down every year and then a portion of it is going to buy the longevity protection. So it is like a guaranteed lifetime withdrawal benefit that exists today. And David's nodding his head because what you're describing is exactly that type of a product. It's also important to remember that these types of products have actually existed on wide scale in retirement plans for over 10 years now. So for example, UTC incorporated one of these types of products into, now Raytheon, into their retirement system and they had a lot of really smart people trying to figure out what an optimal design was, and they actually settled on this as being pretty close to an optimal design that you're investing in a portfolio, you have a certain amount that's withdrawn every year to cover the longevity protection, you maintain that liquidity over time, is the difference between, essentially it is that that difference between...Well, explain David how one of these products works and why it is so similar to what Rodrigo just described, because I don't want to get stumbled.

David: **01:13:55** I mean, you have you have access to some pool of money. If the money that you're investing in goes to zero someone else comes and cuts you a check. There's differences between a GLWB and the Purpose Fund but like conceptually, it's this idea of it's a portfolio, there's some liquidity, if you die, someone else keeps giving you payments as long as you're alive. Now, there's obvious important structural differences like with the GLWB, or your income can't go down. It's managed by an insurance company, but collectively I view these as kind of like a liquid way to get guaranteed income for life which really is different than like the research for the last, going back way back. They're really focused on full and permanent annuitization.

Then, Why Are We Here?

Adam: **01:14:40** But it's not guaranteed income for life. It's only guaranteed income so long as the returns in the portfolio sustain income. You're guaranteed some income presumably unless the markets go to zero, but obviously you're subject to whatever the actuarially forecast change in NAV is at each reevaluation period. So you could be in a situation, market returns are substantially lower than expected, where your income is substantially lower than expected because of this market risk. What you're doing though is, instead of each individual needing to plan to a 95-year mortality, you are planning to the median mortality of the

pool. So you're maintaining the same sort of investment risk but you are minimizing the longevity risk for the mortality risk. And so everybody, everybody comes out ahead. Why is this not more widespread? Why is there such resistance to...I've long said this is, and I know you guys said the same. This is demonstrably the optimal route for the population and yet, 50-60 years ago we migrated from a pension, like a pooled pension structure for retirement to an individual private retirement structure. I mean, that is demonstrably suboptimal for everybody. So why are we here where everyone having a private pension plan seems like the preferred route when in reality from a utility standpoint, pooling your mortality risk is demonstrably the optimal route.

Rodrigo: **01:16:37** Just to be clear Adam, are you talking about from defined benefit to defined contribution to IRAs?

Adam: **01:16:42** The common thread here is the pooling of longevity risk. Never mind sort of the underlying. With a traditional annuity you're making sacrifices in terms of what you can own, you're essentially buying like a TIPS ladder and then benefiting from the mortality pooling. But with this tontine structure you're able to sort of in theory, if there was a wide variety of these, what you'd have is a number of different types of portfolios but all of them would be pooled, so you're pooling the longevity risk while being able to maintain some independence or some sovereignty in the type of portfolio you want to own. So you can have your own capital market expectations, you can have your own risk tolerance in terms of your portfolio risk, etc. but over top of it, we're pooling mortality/longevity risk. So why is this not the most popular way to manage retirement and how do we get there?

How Do We Get There?

Michael: **01:17:51** I think David and I have the same answer to this. And that is that we've not actually devoted a real effort to making a post retirement default that is efficient. So we have created these defaults, structures, these target date funds that are relatively simple in structure. And then at retirement, and especially if people stay in the plan, which is probably better for them in many cases for the average worker to stay in plan, because these things are so cheap. But there is no default into something that's more efficient. So people end up with this portfolio and they have no idea what to do with it.

So there really needs to be a whole rethink of how those those defaults look after retirement and they need to start incorporating longevity protection as a default. If that happens, people are going to like the idea that they can spend their money and they can get guidance about how much they can spend every year and know that they have a guarantee that they're not going to run out. Everybody is going to be happier with that, but they don't get that. First of all,

they don't get defaulted into that. Second of all, they don't get presented with that option. And I think it is a complex concept and there are a lot of behavioral barriers to this idea.

So people will struggle with it. And I think frankly, the industry has perhaps abused some of the elements of these products, and the whole steak dinner example is they take in a structure which is optimal, which I would probably say, somewhere between half and the majority of Americans should be rolling a portion of their savings into an insurance type of structure. But instead they focused on capturing less than 1% of the rollover market, instead of I think having the discipline to create more opaque products where it's easier for consumers and plan sponsors to compare one product to the other, making sure that they're incorporated into default. I think that's where the effort really should have been. But the consequence is that people are actually not living as well as they could because they are not being defaulted into something that is more efficient.

Rodrigo: **01:20:10** So is the Australian superannuation structure something to kind of mimic. I don't know if Australia does this, but I'm from Peru and I know that the superannuation concept is one where you have five providers that are all managing money professionally. You get to choose between three levels of risk and when you die, not when you die, when you retire, kind of the same thing. When you retire, you are then given a choice as to how you want, you get the benefit of the tontine structure and you get to withdraw depending on which one of the three you choose. So I don't know if Australia does that part.

Michael: **01:20:47** They don't , at least that last time I was there they don't. In fact, it's kind of ironic that the annuity industry in Australia was actually less advanced than it is in the United States given the fact that they call it a *superannuation fund.* There's no superannuation.

Adam: **01:21:02** There's no mortality pooling. Yeah.

Rodrigo: **01:21:05** What are the behavioral drawbacks from people wanting to adopt this?

Michael: **01:21:08** Pardon me.

Rodrigo: **01:21:10** You mentioned that there's a behavioral barrier to adopting this, what are they?

David: **01:21:15** … insurance?

Rodrigo: **01:21:18** I missed the question.

David: **01:21:19** Do you like buying insurance? Is insurance fun?

Adam: **01:21:23** No, but it's not insurance. I think what's interesting about this Purpose vehicle is that it's not insurance, there's no insurer. There's no creditor there. If the fund runs out because of bad investment performance, everybody suffers from that. The only risk you're offsetting is the mortality risk. You've still got all the investment risk. So this is why I say this structure preserves individual agency in terms of what you want to invest in, to a to a limited degree. I mean, obviously, this is one fund. But you could imagine an industry built around where every ETF or every mutual fund has a class, which is a pooled class, like a mortality pooled class. And if you like this investment strategy, great. You can buy it without the pooled mortality, or you can buy it with the pooled mortality. The pooled mortality is, in almost every case more optimal than the un-pooled. But we don't see this.

David: **01:22:31** I would argue that it is a type of insurance. So there's on the spectrum of guaranteed income for life, we can go back to old school SPIA. That's like the tried and true you're getting money as long as you live. There is a different kind of guarantee here which is we will pay you as long as the pool can persist in your payment.

Adam: **01:22:53** Who's we? It's the participants paying themselves. I think anyways, it's the participants paying themselves, there's no guarantee from the fund company. With an annuity... It can go to zero.

Michael: **01:23:15.** There's more of an assurance there with mortality than if you do it yourself. But that's the idea of the spectrum. So in theory, the strongest guarantees cost the most. This is a, some would submit, a weaker guarantee so it costs less, but it's still a mild form of insurance versus the pure self-insurance of doing it yourself in an IRA. And there has to be a cost in the notion. That there's no cost to do this is not correct, it's just a lot smaller than kind of that that full on full guarantee of...

Adam: **01:23:39** Hold on. What is the cost? What is the access cost?

David: **01:23:42** Well, you have to, by definition, you're giving up something to get access to the mortality credits. Like insurance, Virtue, explicitly they charge you 100 basis points, 50 basis points. The cost of the insurance declines based upon the provision of the contract. How risky it is, what are the payouts, how does it change? But I mean, if I recall correctly within this vehicle, you have limited access to monies beyond what you contributed.

Adam: **01:24:09** Yeah, so there's costs in terms of constraints?

David: **01:24:14** Yes, that's a cost. It isn't free. So again, that's my earlier question. It's a form of insurance, insurance costs money. Now again, the insurance cost is different,

some based upon the guarantees, but I think in the past we've had mostly products that have very expensive premiums. So again, I would argue that a SPIA is incredibly expensive. You want me to give up my money irrevocably, that's nuts. I think what we're evolving towards now is more of these products that do have a more palatable type of cost to them that should in theory get more interest from the retail public and from advisors. This is an example of a new product, doesn't exist in the US at all today. I like to think they're going to see variations of that where you do have structures that exist on top of advisor portfolios that are low cost, readily available in the US market, but we just haven't seen that.

I think to Michael's point earlier; a lot of the products we've had historically have been steak dinner annuities that aren't necessarily low cost or attractive for the mass market to use or introduce.

Rodrigo: **01:25:14** But that's an interesting point actually, the fact that the seeing the fee of let's say, you invest in the tontine product that Purpose has, if you double your money within five years, whatever you made is not yours. You can't leave it for your family, you can't withdraw it, it is a fee that goes directly to every unit holder. It may increase a bit of your income. … Yeah, but when you die you don't get to give that you family.

Adam: **01:25:47** But you can save the excess. So whatever you save in the excess you are investing outside the pool and that gets left as a...

Rodrigo: **01:25:54** But there's still a fee, if you double your money in five years you could like, I'm sure you don't get that back in the next five years. That is averaged out for the next whenever the launch is expected to be. So there is still a tax, there's a tax to your to your estate, there's a tax your ability to withdraw. So seeing it as a fee is an interesting thing.

David: **01:26:14** There's no such thing as free cake.

Rodrigo: **01:26:18** Back to it.

Adam: **01:26:19** Yeah, no, for sure. And I mean, even with the mortality pool you still have longevity risk because if the average person in the pool lives substantially beyond the actuarially modeled mortality, so then you've got the option, you'd have products that would pool the mortality risk and by a longevity swap for some portion of the longevity risk. So there's a number of different ways that you could structure these. But the common thread here is, and tell me if I'm wrong, but I think it is always and everywhere optimally to spread the mortality risk, relative to having to self-insure longevity.

David: **01:27:09** You're generally correct population wise, but like if you're massively overfunded you don't always need to insure. You need to insure when there's risk that you could actually, a bad thing happening. If you're worth a billion dollars you don't have to do it. Again, that's not the vast majority of Americans. But then again, so back to the fee, maybe they're going to get like the lowest fee. We're using fee in air quotes here type policy, but they don't need as strong...I would argue the individuals that have had the least guaranteed income, the most uncovered, need the strongest form of guarantee. So if you don't have a lot of...

Adam: **01:27:48** …

David: **01:27:47** What's that?

Adam: **01:27:50** I feel like we keep conflating this thing, because for me, there's no guarantee. The guarantee is a different thing. The guarantee is an insurance product. The tontine has no guarantee. There is a pool of assets. At each increment an actuary describes what actuarially the pool can distribute. But the pool, the value of the pool goes up and down as a function of both what happens in the investment portfolio and what happens to the population of investors if more people die or less people die than expected. Rather, I'm not seeing what you mean by guarantee here.

David: **01:28:33** So I guess I'm using the word guarantee loosely. The guarantee is, if your portfolio went to zero, you'd be broke. But you can still get money as long as there's money in the pool, and so I think that, I'm actually working on it right now, we're going to use, I think either use a different word to describe these differently than a guarantee. It's the type of guarantee, an immediate variable annuity has this guarantee, but the income can change dramatically based upon the portfolio performance. So to me, the idea here is that there is some component where you will get income for life but the big question is what is that income going to be, based upon market returns, mortality experience, whatever else.

Adam: **01:29:15** Right. Michael, you've been silent for too long.

Michael: **01:29:22** It's semantics. Honestly, it's about whether the insurance company is managing the excess money that you're essentially paying in terms of premiums. So money is flowing out of the pool, it's getting managed by someone for the purpose of providing longevity protection if people run out of their own savings, and whether it's managed by the insurance company or whether it's managed by an investment company, it is the same thing. So it's this excess money that's being put in an investment account that's being used to ensure that people have lifetime income. Someone has to figure out how much people can withdraw

from the investment pool every year, so you need actuaries to figure that part out. Well, that makes it like an insurance company. You have to incorporate insurance thinking into investment products to get there. And the amount of expense and the amount of fees is really just a function of what you impose on that product. It's not a function of whether it is within the investment world or the insurance world.

So, even with a traditional variable annuity type product that allows a certain amount of liquidity, it ultimately is the same thing, you're paying a certain amount of your portfolio that is being used to provide protection if people run out of money in that investment account. And the amount of money that's being withdrawn in the form of expenses is really, that's part of the management fee, or the efficiency of whoever is managing this scheme. But an insurance company could manage it efficiently or an investment company could manage it efficiently. I think ideally what will happen is, we will get to a point where they are participating to the extent that there is very little institutional risk. This becomes very important in the defined contribution space because when insurance companies are providing these longevity guarantees, that will then fail at the same time, because either there's a big increase in longevity beyond what was expected or asset returns or bond rates are not going to be what was anticipated. Something has to happen that blows it up. If it's participating, it never blows up. But that also means that if it's participating, then the individual bears more of that income risk, and the institution is bearing that risk now.

So, when they're selling you an income annuity right now, let's get back to SPIAs, because SPIAs are shockingly efficient. So we should start from that baseline. Any type of a variable product including tontines is inferior to a SPIA if you don't get an equity risk premium. So it is the equity risk premium that drives any higher income, any better lifestyle that you could get. Now, if you're just focusing on the bond portion of the investment portfolio and you've got that SPIA, it's going to provide a higher income for you every year and there's no variability. So if everybody ends up living a long time, the insurance company is bearing that risk, it is not participating. So in that sense, you're getting something that you would not get through a tontine type of structure. That's an advantage of an insurance type of structure.

Adam: **01:32:35** Well, that should be you're paying for that too. Whatever you're paying is the net between whatever the expected credit premium that the insurance company is expecting versus whatever they need to insure on the longevity side. So there's a margin embedded in that.

Michael: **01:32:52** That load is so small Adam, it's freaking us out a little bit actually.

David: **01:32:58** But to your point, those are great because they're so easy to compare. Like wow, you just compared the yield on a SPIA, everything else is kind of a hot mess. I think there will be others and this would be good but I think SPIAs are so great because they are so competitive, they're so easy, but no one buys them. Like they're just not a popular product at all.

Rodrigo: **01:33:20** So I guess one key issue behind a Purpose style product is that you require an equity risk premia to give you that excess potential for you to participate and do better than a SPIA. If you have a negative risk premia, like let's say we have a 1930s style 85% drawdown. There's two things that are going to happen. You're going to have a massive reduction in your own NAV, but you're going to have a mass exodus of those people that just invested in the fund and said this fund has a terrible manager. And all of a sudden that pooling goes right away. So there's a behavioral risk that you're taking to pool of participants and a negative equity risk premia that you're taking as well.

David: **01:34:00** I think that's the issue with this pool. What if you only have people that get it? What if you have a smaller product with, only like the 100 healthiest people in Canada buy it?

Rodrigo: **01:34:11** Unlike Raytheon, you mentioned Raytheon earlier. That probably has a broad distribution of mortality and they manage, people can opt out if you're part of that company. So that seems perfect for them, this seems a bit more risky if they don't do a good job. Something, Purpose does a good job of raising a lot of cash. You're raising a lot of people so they might be able to pull it off.

Alternative Possibilities

Adam: **01:34:35** That's a very fair point. I want to make sure, and I've already kept you longer than an hour and a half. So I apologize if you guys are starting to feel tired. I did want to close off though with a discussion of whether you have been considering how investors who don't want to go the SPIA route or the insurance route in general can make up the difference between current capital market expectations for kind of plain vanilla balanced portfolios, for example, and the required returns that are needed in order to support even moderate lifestyles in retirement. Have you been branching out into the alternative investment opportunities at all and thinking about what might be possible here?

David: **01:35:34** A little bit, but a really important note is that risk on or risk off in alpha, doesn't actually move the needle a whole lot in these projections. And what really matters is how much you spend when you retire, how long things last. So I'm not suggesting that individuals don't do everything that they can to improve portfolio efficiency. But that's like *a third order effect*. So I think yes, it's obviously worth considering different types of investments. I don't know that

I'm hugely keen on alts. But I always just kind of make the note that that's not going to be the big difference maker in the outcome of the financial plan.

Adam: **01:36:13** Hold on, let me let me poke at that. So, if you've got let's assume like a 3 or 4% withdrawal rate and the capital market expectations on the underlying portfolio are 5%. And now you go from a 5% expected return to a 6% expected return? So that's one scenario, hold on, that's cool. How is a good question? Alternatively, you go from a 4% withdrawal rate to a 3% withdrawal rate. Are you suggesting that going from a 4% to a 3% withdrawal rate is an order different in terms of its effect than going from a 4%? to a 5% expected return?

David: **01:37:01** Yes.

Adam: **01:37:07** Really?

David: **01:37:07** Oh, yeah.

Michael: **01:37:09** So I want to get back to this Adam, because I think what you're saying I have heard in the past, and that is that if you can generate alpha in the portfolio, of course, you can pull out more money every year. And a lot of people have, I saw this maybe 10 years ago, there were all these studies like well, you wouldn't invest in a 50-50 portfolio, you would of course lean small cap value, because small cap value has outperformed historically. Why wouldn't you just pick that money up off the street if it's free? Well, the thing is, it's not free, it's a risk factor, it's a priced risk factor. And it just happened to not work out over the last decade...

Adam: **01:37:51** We've seen that risk materialize over the last decade.

Michael: **01:37:56** The problem is that there is a difference between a risk factor for which you should generate an excess return like beta, like something that has historically generated alpha. Now, that's different for tax alpha, because tax alpha is, in a sense although tax rates are variable, they are stochastic themselves. You can generate a true riskless alpha, even if it is an arbitrage strategy, for example, to take money out of the right accounts in order to generate more income in retirement.

David: **01:38:32** … with less technically realistic.

Rodrigo: **01:38:37** I just want to make sure I'm following here. So, on your assumption, the 1% lower withdrawal rate and the 1% higher rate of return? What is the point you are making that I'm not following? In a linear world mathematically 1% down safe withdrawal, 1% up return with no excess risk taken. You're telling me that the safe withdrawal rate reduction does a better job at maintaining the pool?

David: **01:39:07** Yes.

Adam: **01:39:09** So here's why I'm pushing back though, because *ROI safety first metric* ends up being a really good proxy to estimate the optimal retirement portfolio, and ROI safety first is just the expected return minus the required return divided by the standard deviation, as we all know. But adding 1% the expected return and lowering 1% from the required return ends up being exactly, this having exactly the same effect in the numerator. So I would expect that they would have exactly, basically an equivalent impact on the utility of the retirement solution.

David: **01:40:02** So I mean, you've probably seen research that Michael and I've done looking at that, what do today's returns mean for safe withdrawal rates? And that's where people have said, oh three is the new four. The change and the return assumptions in that research is 3-5% lower, the historical long term average. So to get to this new lower rate, it isn't like you're taking bonds from five to four, you're going from like five to two or one and a half. And that gets you from four to three. So that's an example of research that has directly explored this effect.

Adam: **01:40:42** But you're changing not just those expectations, you're also changing the objective function. Like you're moving from a....Okay, so you're not going from probability success to maximizing utility?

David: **01:41:02** No. We literally recreated the study, and just changed the returns.

Rodrigo: **01:41:10** So what is the breakeven? How many more units of return would you need to equate to a 1% reduction in safe withdrawal rate?

David: **01:41:18** It varies depending upon your base expected return, your withdrawal rate, your time horizon, everything else. I mean, it might be quasi linear, I'm not sure. But I mean, I've done a lot of studies looking at...the 1% is also to be clear, it's a withdrawal amount on a portfolio that is then increased for inflation, the return is attached to the assets. So those are actually two different things to begin with. And the effect of that varies based upon all the other parts of the assumptions. But it's not one for one. The withdrawal rate is of higher magnitude importance than the return. Now again, like I said, you can get some alpha, go get some alpha but it's not like you can offset a 1%. higher return means you're good. That's unequivocal on the stuff we've done looking at just using better current market assumptions.

Adam: **01:42:12** Well, one missing link here which I think may actually close the loop is, traditionally when you're adding returns you're also adding risk. So if you're adding returns and you're adding...so if you're if the ROI safety first ratio is staying the same because as you add, as you increase expected return, your denominator is increasing commensurately, then yeah, I can totally see how

there would not be much of an impact to increasing returns if you're also increasing risk commensurately. And then really, the only thing that's going to matter is or to what to a certainly a higher order would be changes in your expected withdrawal rates.

David: **01:43:05** So we actually held risk effectively constant, it wasn't a risk deviation at all. It's just acknowledging that, I don't know that 10 year bonds are riskier today than they were 30 years ago, we just assumed that we know that the yields right now are lower. So retirees should assume a lower starting place for what they can get at least right now.

Adam: **01:43:26** Interesting, cool.

Rodrigo: **01:43:28** Send me that paper, I would love to read it, or maybe tell me the name and I'll Google it. And then we'll bring you back on to dissect it word by word.

Michael: **01:43:40** We actually had I think three or four papers in 2013 all on this topic. \

David: **01:43:44** Yeah, different ways you can run the models with auto regressive models. It all rhymed. You need to take out less portfolio when interest rates are low.

Adam: **01:43:55** Yeah, fair enough. Well listen, you guys have been incredibly, brought a lot of energy to this and I appreciate you sticking around for almost two hours. So this is great. And obviously, we covered a lot of ground and I think this ended up being a really fruitful conversation. So thanks so much.

Rodrigo: **01:44:15** The retirement planning is so enjoyable. Look at that. … Mike's like just cook getting over some sickness and he's still going, look at you. Spritely.

Adam: **01:44:28** Exactly.

Michael: **01:44:29** I'm going to crash now.

Rodrigo: **01:44:32** We appreciate it.

Adam: **01:44:32** Go grab a drink. Thanks.

Michael: **01:44:34** Thank you guys. See you guys later.

Adam: **01:44:38** See you.