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Welcome to FYI, four-year innovation podcast. My name is Ren Legi. I am a client portfolio manager at Arc Invest. I'm joined by my colleague Brett Whitten. He's a chief futurist at Arc Invest. So Brett, you've been the director of research at Arc since the firm's inception back in 2014. You recently earned the title of chief futurist. Maybe we just start there. What does that entail as a chief futurist at Arc? We've always focused on modeling technologies from the top down and from the bottom up and focused on the granular company-level details and figuring out how broad, how big, how much scope and scale these companies will have over the medium and long term. We actually restructured the research organization because we were going
to hire more talent because there's evidence that these technologies are actually coming quicker than even we anticipated. And so as part of that, we're kind of desegregating the top down. What does this technology look like five and 10 years away from some of the bottoms up work? And so as the chief futurist, I'm making sure those medium and long term forecasts are really well-tuned and consistent across technologies and that then they're being appropriately applied to the individual securities and companies that we're analyzing. And so I think there's never been a more opportune moment to focus on the future because it really is happening faster than you can imagine. And so it requires actually really well-tuned long-term forecasting because those long-term forecasts are flowing into company results more quickly than they were even five years ago. So as chief futurist, that's my focus. I think Arc as a whole is a very future focused firm. So if you look at what's happening in any of the innovation platforms that we focus on in AI or public blockchains or multi-omic sequencing or robotics or energy storage, the electric vehicle revolution, it's all infiltrating multiple sectors and in this very, very tangible position of inflection right now at this moment. And so the intention for us is that, well, we need to even understand the world even better. We need to understand how these technologies are going to change in a more profound way and we're leaning into that. And so it's a lot of fun. And why would you say Arc focuses on disruptive innovation? What's the size and scale of these opportunities and what makes Arc more uniquely positioned to capture it and better understand it than the rest of the market? I think future historians will look back on this moment and they may even look back on November of 2022 and say, wow, that was when chat GPT was released, which has a silly name, but an AI chatbot that is performative as that product and that is accruing users at an unprecedented velocity probably marks an inflection point in history and the capability of software in people's hands. And so it's very clear to us, that's just one example, but that this

business cycle is going to be seen as the business cycle where technology changed everything. And so as an investor, as an asset manager, as somebody who's stood in a pool of capital, we think that the best way to position yourself in a technological boom is to focus directly on those technologies and guide your assets on the basis of your understanding of those technologies. The way in which we, so disruptive innovation is, I think that the right way to manage money, particularly in this moment where collectively, the innovations that we focus on are worth roughly around $10 trillion today. And we think by the end of this business cycle, more than half of equity market cap is going to be attributable to these disruptive innovations versus maybe it's 10% or so today. And so there's a huge tailwind to asset owners in the space that we want to take advantage of. And we focus on disruptive innovation because people have a lot of exposure to disruptive innovation on the short side that they don't even realize. And so we think it's a real service to clients to be a pure play disruptive innovation manager when they may have a traditional rail company in their core index holdings that will be severely disrupted if, as we believe, electric autonomous trucks price costs competitive on a ton of mile basis with freight rail. And that's one example. But across every sector, I could name one where it's typically a very large kind of industry in core portfolios that is really subject to risk. And so we think by focusing both as an allocator and an investor on disruptive innovation is a way to actually de-risk your portfolio against the disruption that's coming. And so then why should we be very good at it? We've aligned the research team and portfolio process directly against innovation. We are analysts, are experts in the technologies and focused on the technologies, which gives them a real competitive advantage against sector specific specialists who an auto analyst would just take the word of the CEO of the auto company that electric vehicles were not going to be cost competitive within the forecast horizon. That's clearly wrong, but that's what they're being told. And so it gives our analysts an unfair advantage as these technologies cut across sectors. We intentionally look through the business cycle for how much these technologies will be worth, which is really important for steep cost declines. The results of that doesn't manifest in a quarter or two, but over three and five years, you unlock a lot of unit demand that the street often doesn't anticipate. And so we have an intentionally longer term point of view in our underwriting framework and how we analyze the companies that we expose ourselves to. And we are transparent. We publish our research. We are very active on social media sharing our findings. And we do that because that's the way to understand more quickly how big or not big a particular opportunity is going to be. And it's particularly important because these technologies are platforms on top of which other innovations are being built. And you cannot underestimate how much stuff will happen on top of them. The velocity is so quick. And so our team is always in a learning mode, which is really, really critical and important and very against the grain of traditional Wall Street, which tends to not share information and not want to be open about really how it believes and feels. And so those factors that we have a longer term point of view that our analysts are focused at the technology level itself, when technologies are cutting across sector, and that we use the power of the world's information networks by sharing information with it, which provides us with information back against innovation platforms

allows us to have a better sense for the direction that the world is moving and how big these technologies are going to be. And so that's both why we do it and how I think we've succeeded over time at doing the forecasting that we've done. And now we'll succeed into the future.
You mentioned you focused on a longer time horizon, right? But we're certainly in this macroeconomic environment faced with a lot of short-term headwinds last year. And still, we're focused on investors and allocators are focused on rising interest rate environment, entering into a recession. These are challenges in the short term. We'll see how we overcome them. But in your view, do you think that has had any impact on the technological progress of any of these innovations? If you look back at 2022, you mentioned chat GPT. Has there been other breakthroughs that have largely been unaffected by what's happening in the macroeconomic environment?
Yeah, across every area, innovation seems to be churning along. For one thing, we're really grateful for our clients. Our clients have stuck with us and really understand that innovation is inherently volatile. And that because we are investing in the promise of future cash flows, if people are feeling nervous and want cash flows today and are shifting back into kind of their core indices because they just want to feel safe, that that flow will cause under performance in our names. There's a saying that in the short term, the market is a voting machine and the long term, it's a weighing machine. Well, we really try to play the weighing machine game as in we measure the companies at what we believe is their fundamental value five years forward and act as if we're a forced seller to somebody just for the cash flow they can generate at that time. And that's how we underwrite positions. But we don't try to directly play the macro cycle as in make a market call. We think the service that we provide to clients, for instance, we don't go into cash or anything, right? Because off the bottom of a turn is when you can get a lot of a move in the market, particularly in flow sensitive names. And so we think that the service that we provide to clients is to be exposed to innovation and 100% exposed to the innovations that we think have amazing compounding opportunities over the medium term. And I think that's why clients are stuck with us is because we say what we're going to do and we do it and we follow the process without kind of deviating because if they are feeling relatively nervous, they can go into cash with other parts of their allocation portfolio. And there are some companies that these companies are capital market sensitive to some degree as are all companies. So I think if you've been paying attention to the news, there's been a lot of tech layoffs and those tech layoffs are in part because their stock prices are down. And so the cost of that talent is up because they compensate in equity to some degree. And for companies in the earlier stage space or in the startup space, if they're having to stretch their balance sheet between funding rounds over a longer period of time or they're getting balance sheet sensitive, they begin to assess, hey, these are all the programs we're working on, what is really core to kind of the mission of moving this company forward. And sometimes that can be a very constructive kind of set of decisions to really trim off some baroque projects that don't actually address the core mission of the company. And sometimes companies get impaired if they have to, then a balance sheet going into those circumstances. And so from a modeling perspective or from an understanding the company perspective,
of course, we're very balance sheet focused and understand the money that we believe is going to be required to get to the finish line. Largely at both the technology level and the individual

company level, the companies that are exposed to innovation are one more profitable than I think people understand and that a lot of these companies are even if unprofitable, they have clear glide paths towards profitability and towards cash flow positivity that allows them then to build on top of the strategic platforms they've built in the technologies. And I'll also say it's not just AI, it's across every sector or every innovation platform. There's evidence that things are happening quicker. And partly it's because an advance in AI feeds into every other innovation. You can't have autonomous vehicles without having a strong neural net driving them and neural nets are moving more quickly, which increases the odds we think of a robotaxi network commercially
scaling in a really profound way. We believe that blood tests that will be able to diagnose the early stage cancer are going to become pervasive and really part of a standard of care. This creates tens of billions of dollars sized market that didn't exist a couple of years ago. And part of the way and reason that's going to happen is because we're getting data not just off the sequencing machine, but also data from your digital health records and data from a layer on top of your DNA that controls which DNA is expressed and that being able to take all of those orthogonal streams of data and compress them together to understand whether or not somebody has an otherwise undetectable early stage cancer from a vial of blood is an AI problem as well as a biological sciences problem. And so you pick an innovation, there's both a sign that it's really moving, that it's at a critical stage of inflection and that it's in some ways informing another innovation and that innovation's informing it and catalyzing its growth. I've never in my life seen the market be so muted to innovation when there's so much evidence on the ground that innovation is increasing in velocity. If you had released all of this AI material two years ago or two and a half years ago, the market reaction would be profoundly different. And so it's just interesting how the market cycle can be totally offset from the innovation cycle. And I think it's a great opportunity to get exposure because you have mind-melting advances that are available. I see them as on the cheap at bargain-based basement prices. And that's when, as an allocator, you should be aggressively deploying capital into a space that has a great set of tailwinds and it's being priced as if it's X growth. This is a wonderful opportunity.
As an investor, an allocator, when we're looking at these individual technologies, they're perceived to be maybe earlier stage or risky and we've seen because of the macroeconomic environment heightened volatility, how do you think about that? That they're maybe too volatile from an investor's perspective and how can you just gain exposure to these without taking kind of increased volatility within your portfolio? I mean, there's no question that you shouldn't put money into innovation that you want to extract in a year or two. And so it fits into a portfolio allocation because you are allocating a portfolio. If you need the cash in six months or a year, even two years, I'd argue equity exposure isn't for you at all.
The equity market, there is no guarantee that the equity market is not going to be down 20%. A few months from now, there could be a black swan event. I think it's likely that we're going to enter a recession at some point. I take solace in the fact that kind of the innovation names that we're exposed to have already discounted a lot of damage to them individually and they're not as traditionally macrocyclic-ly sensitive as in the innovation during kind of recession type events tends to actually take share because people are forced to reevaluate spending decisions and really innovation wins against inertia. If people stay with what they were doing before

because they're feeling comfortable, then it's hard for innovation to gain traction. It's when they're having to make really hard choices that they look at the thing that they were kind of scoffing at before and say, hey, can we incorporate AI into our business processes and save ourselves money and continue to grow? There is uncertainty out there. There's uncertainty in the macroeconomy. There's certainly lots of uncertainty and argument about what innovation is worth. And so because of that, it leaves it more sensitive to people bailing into cashflow during an interest rate cycle. I think that volatility is inherent to the innovation space and it's also a sign of how early we are in kind of the development of these innovations. Take chat GPT. We don't know exactly how many, but it's millions, maybe tens of millions, but not much more than that who are using it today. And across all generative AI products, it could be it's on the order of probably 30 million or 40 million users. So this is the stage. There is no question in my mind that there will be billions of users of this product over the next few years. Over the course of this business cycle, these products will inform every software that people interact with, sometimes in profound ways. And so you're going from units in the tens of millions to units in the billions. So you have multiple orders of magnitude of growth behind you. And people don't know, it's hard to say what that's going to be worth. And so until people see the cash flow, they're not going to be stable in their assessment of value. So it means that it's more volatile until it gets to a stage where it kind of like the final, like, oh, this is the equilibrium amount of cash flow that's going to flow into these models is going to be. And so the volatility is a sign of how early we are. And volatility, it feels bad on the downside, but it feels great on the upside. And so that's why, particularly if you've had down draft in the market based on interest rate cycle, getting innovation exposure as that's turning, it's really a savvy thing to do because our belief is that actually the assets are massively mispriced. And so if it's a responsible portion of your portfolio that you don't need in the next three or four years, and I don't know, I'd ask you, Ren, what do allocators say is a responsible portion of the portfolio today? And what do you think is the actual answer to that from your perspective? You say it's going to make up more than 50% of the global equity market cap over forecast in 2030, right? But no way anyone's going to put 50% of their portfolio in it, right? But if you think about the size of the opportunity, and we've done some work on just how it kind of fits in a portfolio, because we look at it as a kind of a new asset class. I mean, it really doesn't fit into kind of a broader equity or even global equity kind of asset class because innovation, as you mentioned, it cuts across sectors, geographies, market caps. And it's providing exposure to a lot of companies that are not held in broader based indices. And as you're setting your strategic asset allocation targets, typically, and we've seen, I mean, this is a trend that's been happening for over a decade now, a lot of equity investors are moving more passive. And so they are overexposed to those benchmark holdings. And as we continue to kind of dig into those, these benchmarks like NASDAQ, which is kind of using the tagline as an innovation index, which we would kind of disagree with, because when you look under the hood, there's not much innovation really happening in that index. And we're trying to kind of provide that with our portfolios to provide investors and allocators with exposure to artificial intelligence, gene editing, these technologies and companies that are the key enablers and beneficiaries of those technologies that they otherwise would not have exposure. And you mentioned kind of, if you're holding the benchmarks, you're basically almost

short innovation because you just don't have those companies that are going to disrupt
these existing companies and potentially even industries and sectors.
If you believe me that it's going to be more than 50% of global market cap,
wouldn't 50% be the right number? I mean, just I know that from an allocator perspective,
it's hard to convince an allocator to do that because it is volatile.
But conceptually, wouldn't that be the right thing to do? You're just getting ahead of where
the indexes are eventually going to go. Yes. I mean, conceptually, it makes
sense if you believe that. I think as allocators think about it and they set their strategic
asset allocations, they're also very kind of, I would say even more so in the institutional space,
they're very benchmark kind of centric. They want to set for each asset class or each strategic
allocation, they need a benchmark to see how they're performing. Are they underperforming,
outperforming? And if they're underperforming, they need to make changes. Now, you can argue
that may not be the best approach now that kind of technology is seeping into every sector and every
industry, but that's how they think. And so innovation kind of has very high tracking error.
And so it's been challenging for allocators to really kind of tag a benchmark to innovation
so that they can make it a larger portion or make it a core holding in their portfolios.
I think there's been some MSCI has launched an innovation suite of indices. So I mean,
there's going to be ways to kind of track it a little bit better, but really innovation and
the way we think about it is pretty much agnostic to any benchmark because these are holdings that
will likely become part of the benchmarks eventually. Yeah, I think one of the things that's happened
is that they've managed to not do it in part because they feel like they get it through
venture capital exposure. And that has like this characteristic that's attractive to them,
but it really actually shouldn't be that it doesn't mark to market as frequently or sometimes not at
all. And so it's kind of like volatility concealing. It's like you own this asset and,
oh no, it's not moving. Don't worry about it. Right. But if those assets were honestly marked
to market as in to the daily liquidity or in a minute liquidity that public equities are subject
to, they obviously would be even more volatile than the public equity space. There's no question.
It's much less thickly traded. It is subject to daily flows. There would be much more flow
sensitivity than there is in the public equity space. But the reporting requirements for a
private equity portfolio, and there's good reason for this by the way, but the reporting
requirements are such that sometimes assets are not being marked within a hedge funds book or
a venture capital book, at least in a robust way except once a year or once a quarter. So
allocators are like, this is great. I get the upside without having to see the volatility,
even though the volatility exists. Isn't that a little odd? Isn't it like kind of like we're
playing an accounting game and it seems like that should eventually resolve?
Yeah. I think that's a great point, right? Just because you can't see it doesn't mean
it's not there. And if you have a long-term time horizon, volatility shouldn't be considered
kind of a bad word, right? And it's kind of taken that sense in the public equity markets,
because you can see it on a real, almost basically real-time basis. And on the private
venture side, yeah, these are, you know, they're making investments that may not pay off for
five, seven years, right? And in some cases, that's also true with a lot of our holdings.
So, you know, I think volatility also creates, when you have that ability,
or when you have that daily volatility, it actually creates opportunities, right? Because

innovation is inherently controversial. And so when you have companies reporting and missing on short-term expectations, they become more volatile, they may trade down, and that creates an opportunity to maybe start building positions in our stocks. So, I think that makes a good point. And also that we're seeing kind of, you know, I'm seeing, as I talk to a lot of clients, you know, they're thinking about taking exposure down in the private, because the valuations are just off between public and private. And so, you know, the truth is probably somewhere in the middle,
right? But this is an opportunity, and it takes time because, you know, that's fairly a liquid asset class, but we're starting to see that transition. And it's happened, I would say,
I've been hearing that for now, you know, almost two years that they're looking at kind of decreasing private or venture exposure because of the current economic environment. But they're seeing opportunities from a valuation standpoint in innovation within the public equities market. So, I think it's creating opportunity, right, for over the long term for those that maybe only have 1% of innovation exposure in the portfolios, right? And you're saying 50, you know, it's somewhere in between, but it's an opportunity to kind of leg in, build that strategic allocation. Again, it may not be the core, right? But it certainly should be a sizable
allocation that kind of at least moves the dial, right, at the end of the day.
1% is probably not going to do much. It's definitely better than nothing, right? But, you know... Well, it's kind of like if you... I like your idea that, you know, and I agree that volatility is an opportunity. There's two things I want to bring up. One, volatility is an opportunity, like an interesting characteristic of the venture side is, sure, if you were to mark those assets to market today or mark them daily, you would get extreme price swings. Unfortunately, as an investor
or allocator, you actually can't operate on those price swings, right? Because the strong companies are coming to market when it's strategically in their interest, which is not on the downside
of the price swing, right? So, it's not as if you want an exposure to Mosaic ML and you can automatically get it at a great price unless you have a relationship with Mosaic ML or unless you're an expert in technology. So, you can't... Or Stripe or SpaceX or whoever, like the price swing doesn't give you the opportunity. In the public market, the price swing, the opportunity is there. And so, if you have an ambition to get to a strategic allocation, like the volatility is amazing to build up into that spot, and then it provides you a mechanism by which to essentially harvest that volatility into the innovation exposure that you're looking for within your core portfolio. The other thing I wanted to bring up is, I think there's a conflation between volatility and risk and the financial literacy material for everybody, for allocators, for MBAs, that I think it's just wrong. The idea that because something prices more volatility implies that there's more risk embedded. It's just inaccurate.
And it infects all of the reporting on allocations and people... Even the idea of tracking error, it's like your venture portfolio would have a lot more tracking error if it were marked at the same way as the public equity book. And as I said before, volatility is indicative of uncertainty, which is not the same as risk. If you've underwritten the uncertainty in a robust way, and you actually think the uncertainty exists because it's mismarked relative to fundamental value, then the volatility is not a risk. That's a sign that this is a great opportunity,

assuming you've done your underwriting well. I can understand why volatility is conflated with risk. It's because a lot of people see volatility not as risk to the overall appreciation of my portfolio, but risk to me in my relationship to my clients. I think it's natural for allocators and advisors to not want more volatility because they don't want to have to explain it. And they want to pretend that things always go magically up and to the right without deviating. But that's actually the challenge of being a really good allocator of capital, is being able to expose yourself to those opportunities that are mispriced and help your clients or your investment board or whoever you're answering to understand why it's mispriced,
understand why the price action does what it does, and why it's a good exposure to not only keep but to increase in these circumstances. Yeah. And I think that's a good point. And on that note, it's important not to change your stripes when things get tough or uncertain. I think, and it speaks to the retention of our assets, we have not changed our strategy even in this very significant drawdown and bear market for the last two years. Can you maybe talk a little bit why you think that is and how important that really is? Yeah. For one thing, as I've expressed a number of times, at the technology level, there is no question that innovation is happening. Not just happening, it's going to change entire industries in profound ways. By focusing at the technology level and then demonstrating and detailing how much opportunity is there, it then translates into expectations at the securities level that suggest there's profound upside embedded in these positions. We think that you really have to look through the business cycle to see the value creation that occurs. And you can go through the history of technology and see how it's happened. In computers, you went from the hardware as being the dominant part of the value chain to the operating system being the dominant part of the value chain to the connected computers as a whole and the internet being the dominant part of the value chain to the mobile device connected computers as a whole being the dominant part of the value chain. With each step along the way, you roughly increased enterprise value across the whole value chain. This is very rough. But by basically an order of magnitude, and so suddenly you have a multi-trillion dollar company in Apple that's sitting at the right spot in the value chain at the right time for that technology exposure. Well, we think that the next operating system is going to be AI based and that there's going to be a changing of the guard. And that actually a lot of the mega cap techs companies are going to be put to risk because of that changing of the guard. And so as a manager of money, we're looking at, hey, is there a potential, another order of magnitude increase in enterprise value associated with this kind of technology stack? And the answer is yes, absolutely. In fact, that honestly may be an underestimate, maybe an accurate estimate. And so then we can say, well, if we're going like another step change up from here, how do we expose ourselves to that step change up? And the problem if you say, oh, well, yeah, it's happening. But right now, next three months, there's going to be a recession. So I don't know if technology exposure is what I mean. You might miss a 50% move. You might be sitting there being like, well, I'm trying to get into this. If you look at the history, particularly of investing in asset classes with profound tailwinds, that the dangerous thing to do is to try to get really cute about your exposure to cash versus exposure to the asset class. It's really hard to market time. And so we think being fully invested and just focused on the innovation space, both for us as kind of managers doing what we say

we're going to do for clients, it's important. And I think for clients in terms of thinking about what is the future going to look like five years from now? And what do I need to be exposed to to really make sure I take advantage of the compounding that could come based on these technologies? And the answer is not, well, I'll see how a little bit of this cycle plays out before I get exposure. The answer is, wow, you have an opportunity now. You have an opportunity now to be exposed to these tailwinds. And so you should be really measured but aggressive in doing so. Yeah, I mean, you should also be disciplined. I mean, that's key for investors to really trust in the strategy to be a tool in their overall portfolios. And I think a lot of growth managers back in 0809 that caught off sides in that aftermath because they deviated from their mandates. They were so benchmark focused, they didn't want to underperform, potentially lose clients because they severely underperformed and they missed out on significant upside as the market started to rebound. And so because they weren't exposed to the growth names they should have been or that they were very kind of bullish on going into 08. And so that deviation, there's a lack of trust there now. And we've gone through that pretty significant drawdown and we've kept to that discipline. We continue to do what we say we do, provide the purest play exposure to innovation. And I think that's the other reason why our clients have stuck with us because they're thinking about this longer term. Like you said, we're not taking cash and we're not going in cash and trying to protect necessarily in the downside. But that also warrants, we've been very transparent about that. So in down markets, we do and will likely underperform and because we're not providing necessarily, we're not downside protection managers. There's plenty of great managers that do that. They can use exotic derivatives and stuff to hedge. That's not what we do. We're providing that pure play exposure and we're positioning the portfolio as we consolidate to kind of for that next leg of growth because we're thinking about this over a full market cycle. So I mean, I think that's what's kind of happened with the market. We think the market's been wrong about these innovative tech names. Valuations are down. They've been attacking unprofitable tech. Their consensus views going into this year have been very bearish. That's kind of another question here. What do you think they're missing? What are they not seeing out there that it seems so obvious to us but not obvious to the market based on where these stocks are trading? Like some of them are trading almost devalued. Even the phrase unprofitable tech, I think, is indicative of how the market misunderstands what's going on in this space. It's like, look at Tesla. Might be the best gross margins in the industry and growing 50% roughly or 40% year over year in terms of units relative to an industry that's shrinking. And they have an entire software overlay potential to the story where right now that 25% or so gross margins they get on a vehicle sale, that turns into gross profit. But it's a one-time event on a vehicle they've manufactured. If they can deliver scalable autonomous capability, then they begin to generate operating profits off of almost every vehicle in fleet on an ongoing basis per annum that could be of equivalent size and maybe even larger than the profit they're getting off the one-time sale of each individual vehicle. And so the entire financial characteristics of the company transform. But they are massively cash flow positive today as well. And in fact, they have more cash than they can efficiently reinvest as far as we can tell. As in, it would be nice if they could build even factories even faster, even though they're building factories faster than any automotive company in the world today. And it's not just Tesla if you look and you probably have the statistic

off the top of your head. But if you look at the names that we're exposed to, unprofitable tech is not a good way to phrase it in part because these companies are not only have tremendous tailwinds and are on glide path to a lot of cash flow generation, but also their cost structure is much more flexible than people give them credit for. So if you think about what these companies are doing with research and development costs, that is investing in the future. But it's also an investment you can defer if need be or stretch out over time if you really get balance sheet sensitive. Much of the cost structure of these tech businesses is in the human capital and the talent. And that's much more easily dealt with relative to incumbents that are in the core indices who have big fixed cost structures often with debt against those fixed costs and that will get put really off sides in the event of getting disrupted by these innovations. And so I think that people when companies are capital market sensitive, separate from being macro economically sensitive, people look at the, oh, this capital market sensitivity, it gets recursive where the stock price is down, so the cost of talent is up. And so the companies look relatively worse. But some of the characteristics that make them look relatively worse in capital market sensitivity measures actually put them in a much better position during actual macro downturns. And so one of the things that we've noticed over time with the innovation names is they tend to turn and outperform before the broader market kind of goes through a recession. So it really underwrites the macro cyclical slowdown. If you look in even the global financial crisis, but across the board, the innovation names tend to lead the market. And I think it's partly because of this dynamic where they can more agilely adjust to relative changes in the rate and funding. And then the companies that get into trouble have to turn to them for products as the recession hits because they need to right size their own cost structure and don't have nearly the flexibility in doing so. And we've seen a lot of our companies raise capital when times are good in 2020. Their stock prices were elevated. They did secondary offerings. And those were the companies that were probably hit the hardest because they had low cash balances and high cash burn when the pandemic first hit us. And so they learned from that, hey, let me get some, this is a high cash burn business. I need to raise that capital. This is attractive valuation. Let me beef up my balance sheet and then be able to weather the storm if it lasts two, three years. So I think a lot of our, from a balance sheet quality perspective, a lot of our companies are still sitting on, if you look at their current cash burn rates, they're still sitting on at least almost two years worth of cash that can continue their operations. And like I said, they also have other levers to pull, take down a little bit R&D. If they have to, if this continues to get worse. Now, on that note, I mean, where the latest Bank of America fund manager survey said that cash levels are the highest since 9-11 in 2001. Investors are the most overweight bonds since April, 2009. We're also seeing from the CBOE equity put call ratio, it surged above 2.0. I mean, it's the highest level in records. So that surpasses tech and telecom bubble and bust as well as the global financial crisis. So you have a ton of capital kind of sitting on the sidelines now. What do you think it's going to take to get that capital off the sidelines and start taking positions in innovation? It sounds to me, it's not sitting on the sidelines. It's basically like a basketball that's being held underwater as in they are like, people are taking on negative or less than one beta positions. And in my experience, typically the way this plays out is first the market rallies and the innovation names rally and people hate it. They think it's, this doesn't make any sense.

And oh, this is just a dead cat bounce and they have all kinds of short ends they use for it. And so in part, typically on terms, there's not like a specific, hey, this is the reason this is happening. It's just like the marginal expectations of Fed tightening are diminishing somewhat. And then you will end up with either company specific catalytic events or kind of macro-catalytic events that cause everybody to kind of shake their head and say, oh, wait, actually, these growth rates are not decaying in the way that consensus expectations have them decaying. And then if you have any reasonable expectation for growth on a go forward basis, then there's actually a lot of embedded potential cash flow generation in these assets. So if you look across all of our companies and you look, and this is probably, it's true now, it's probably often true, but I think it's particularly striking now. If you look at the expectations for next year's growth, the year after is kind of like cut in half again, whatever. So the consensus expectations for tech names is kind of like you get one year more year of growth or for some of the companies, the growth rate is very low because they're dealing with still you know, compares to COVID and kind of like the choppy macro environment. And then the year after,
as if kind of whatever they were offering, they've fully penetrated the space. And I can guarantee you that the companies that were invested in have not fully penetrated, or at least in our view, kind of the spaces they're going into. And often they are in the single digits exposure. Again, back to electric vehicles, it's like electric vehicles was, I don't know, roughly, it's less than 10% of global vehicle unit sales. But we think that over the next five years, more than 90% of vehicle units, it'll be sticker price better to buy an electric vehicle. Forget total cost of ownership. Forget the fact that like buying a model three today is lower total cost of ownership than a Toyota Camry. Like the upfront dollar you have to spend to get a better performant product that saves you money over time will be lower. And so it's clear to us that the entire motor vehicle fleet buying behavior is going to have to change over. But the companies are priced as if, well, whatever amount you've gotten, you get a little bit more and then it kind of diminishes off from there. And so even as that next year's kind of consensus results as these one queue numbers come in for companies and they begin to guide to what this year looks like, then that could actually cause like a cascading effect on expectations for top line growth where it is like, oh, actually, they're still growing through this. And there's a really bad macro cycle. So everybody else is like actually suffering from worse growth and worse profitability. Everybody else, I mean, core indices. And so it's actually all of these innovation names look actually quite a bit more attractive, not even just the long term basis, but on the short term kind of tactical basis as in they deliver growth in a growth restricted environment and better growth than people were anticipating. That set of factors could cause a pretty severe tactical rally would be my assessment. And we'll see. I mean, I think the nice thing about investing in medium and long term tailwinds is you don't have to be so catalyst sensitive. And in fact, often when there's a catalyst that people can point to and be like, that's going to be the thing. Well, that's been priced in. And so I think that the long and medium term story is it's like much bigger and wilder than even we anticipated two and three years ago. Like what's happening in technology is I've never seen things moving so quickly and never seen kind of the profundity of the products that are being launched as we see right now. And historically, when you have profound products enter the marketplace, they capture profound

amounts of cash flow and enterprise value. And that's what we think is going to happen.
And so kind of with that as a context, you don't need a catalyst. You actually just need to get exposed because the catalyst will be the cash flow that comes. Microsoft is not dumb for investing in open AI and saying, hey, we're going to invest 10 billion in this opportunity.
And there's a lot of other players in the value chain that are really interestingly positioned. We think that the size of the AI software market is going to exceed by multiples. The overall IT market global this year. And the reason why is because the productivity event, you get off of AI software, it's going to be profound. And that impacts every single innovation sector. The genomic space is being super powered by AI. The robot tax opportunity, it requires AI to work. Robotics is suddenly going from something you have to keep in a cage to something that can work right alongside a human on the distribution center floor.
And right now, people still think of robots as how many robots per 10,000 employees are in an operation. That's likely going to invert. You're going to have more robots working in factories than you have humans. And that's a great thing. We'll produce lots of products for much less expensive than we were able to before. It's so clear that things are happening quickly.
I think that people, it's nice that there's a great price point right now in our view.
And over the course of this cycle, I think not guaranteeing when, but I believe that people who took aggressive innovation exposures at this moment will look really smart and they'll make their clients really happy. And that's what we try to do as well. That's why I talk to clients. That's why you talk to clients. Because I think it's the right thing to do is expose yourself to innovation. I think it's absolutely important. And this is the moment to do it.
All right. I think we're going to end on that note. As always, it's been a pleasure catching up with you, Brett. Thank you for the time. And we have our big ideas 2023 coming out. And that's where we highlight a lot of the breakthroughs in these technologies and how big they could be over the coming years. So I would encourage you all to tune into that as well.
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