

The Stock Podcast Interview Transcript

Participants

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Brinton Johns, Investor and Co-Founder at NZS Capital, LLC

Nate Abercrombie, [The Stock Podcast](#)

Interview Transcript

Nate: Brad and Brinton, thank you very much for coming on to the program.

Brad: Yeah, thanks, we're glad to do it.

Brinton: Thanks for having us on the show.

Nate: Yeah, my pleasure. So could we start out with your background.

Brinton: Yeah, the short version is I worked at Janus Capital, which is a large mutual fund company, for about 17 years. I actually started on the phones there and then became a research associate and eventually an analyst. Brad was one of my first bosses as an analyst and then eventually started to manage the tech team and then manage the portfolio. And Brad and I, somewhere along the line, became peers and really began to understand very quickly that we could think well together. We thought better together in some instances than we thought apart from each other. And out of that, over a long period of time and a lot of frustration, a lot of mistakes in investing came sort of a unified investing philosophy that made a lot of sense to us. So that's my quick background.

Brad: Okay, this is Brad. I started at Janus Capital, which is now Janus Henderson, also in 1998 as a summer intern. I started there full time in 2000, so I got to experience the euphoria of the last couple years of the .com bubble followed by the pain and the crash. And then I started as a small cap generalist. I covered a bunch of sectors. Always a little bit of tech, but anything from entertainment to retail, a little bit of healthcare, true of anything under about \$2B in market cap. And then started specializing in tech in 2003. So again, managing the analyst team of tech analysts which is about when and Brinton joined in, as well, a little bit after that. And then managing the global tech fund starting in 2011, working with Brinton. It's been a lot of fun to learn about all the areas of the tech sector and sort of live and breathe disruption and innovation for 20 years now.

Nate: Do you guys talk a little about what you're doing today after leaving Janus and starting your own fund, right?

Brad: Yeah. So we're really excited. Earlier this year we formed NZS Capital. And I'll take a minute to explain what the N, the Z, and the S stand for because it's not obvious. But one of the pillars of our investment framework is really looking for companies that create win-win outcomes for not just their shareholders, but for their employees, customers, also the environment and society at large. And so NZS is an acronym for non zero sum. Non zero sum is an outcome in game theory. That's kind of how we think about the world. And when you're creating a non zero sum, a positive sum outcome, everybody's winning. And often times, a company is creating more value for their customers than they are for themselves and that ends up making it a good company to invest in. And that philosophically aligns with what we want to accomplish with NZS Capital, is

we want to create for value for our clients, for our employees, and society environment at large, which sounds like sort of a silly goal for an asset manager, but we think it's just increasingly important. And so NZS Capital is based on our investing framework called complexity investing, which I'm sure we'll get into. And it's very similar to the way we've managed money for a long time. We'll be focused on the tech sector, but also sectors that are being impacted by tech, which is pretty much the whole world now. So very much focused on innovation and growth.

Brad: So this idea of NZS ... Actually, one of the first times I came across the concept besides learning about it in statistics and math for physics classes 20 years ago, was a book called Non Zero Sum by Robert Wright. It's a really interesting book. If anybody wants to learn more about this, I recommend checking it out. I think it's about ten years old now, but you should still be able to find it. And it goes through the history of basically human civilization and how we've grown and progressed and continued to progress as a society by creating these win-win interactions. And it seems to be a fundamental element of human interaction. It even applies to business, also. And so we wrote about NZS in a whitepaper that we finished back in 2014. And so it's one of the characteristics of many that we look for in companies. And maybe, Brinton, if you want to talk about that whitepaper a little bit.

Brinton: Yeah. So the whitepaper was really sort of a product of us investing for a long time and making our fair share of mistakes. We realized that we had these heuristics in place for managing a portfolio, but they didn't really materialize for us in the words until we began reading about complexity in science. And so complex systems is an area that we're really fascinated about, but first what we sort of tackled on this topic was written by Eric Beinhocker, called The Origin of Wealth. And the following one was called Complexity by Mitch Waldrop, I believe. Both of the authors had spent a lot of time at the Santa Fe Institute. And so very quickly, we realized that the Santa Fe Institute was a special place that we wanted to get closer to.

Brinton: We attended a four-day seminar at Stanford, put on by the Santa Fe Institute and Complexity. And that's where, really, we began to put legs onto this investing framework. I don't really remember when we started writing it, probably 2013. And it sort of came a chapter at a time, slowly at first and then began building. And we realized, "Oh, wow. We actually managed the portfolio to these standards quite a bit, already," but articulating them just made everything so much more crisp.

Brinton: And especially, we did change one big area where we manage portfolios. In the process, we figured out that we basically stranded a lot of capital in the portfolio, about a third of the capital, in names that we did not consider either what we call resilient or optional. These were names that were garpi. They were growth at a reasonable price or not too expensive, but really not optional, but kind of expensive, so really not resilient either. And what we figured out is, over eight years in those types of names, we had basically market performed. Those names that were highly optional, we were running at smaller positions in the tail and we did very well there. And then names that were highly resilient, we ran as larger, concentrated positions in the head of the portfolio. We did very well there. So we finished the paper up in 2014, sort of put it out there to the world because we realized that other people's comment were just going to make us better. And we've learned a ton since then. But the heart of the investing philosophy remains the same.

Nate: Could you describe the resiliency and the optionality? You talked about them briefly there, but what does that mean for you guys?

Brinton: Sure. So when we think about resilience, the first thing we're thinking about is not losing. And so a big part of performing well over time is not losing because, to win, the first thing you need to do is not lose. Seems obvious. Those positions, we have a narrow range of outcomes, is the way we think about them. So we know that humans are really terrible at lots of things, but one of them is certainly predictions. We can study empirical data, we can say humans are really good at being overconfident, but not really good at predicting the future. So when we think about these large, resilient positions, what we're trying to do is minimize the number of predictions we're making about a company. And with that narrow range of outcomes, we feel comfortable in owning those as large positions. So we may only run 15 positions in the head of the portfolio, and let's say that's roughly half the portfolio.

Brinton: But in the tail load of the portfolio, coming into the optionality piece, we may have 50 names. We may have less or more, depending on the global context. And in the tail of the portfolio, we're really looking at asymmetry. So this is more of a classic VC type model, venture capital type model, where we can lose more than we win, but the names are so asymmetric that we can still win. So the asymmetry is incredibly important. What is the opportunity set for that company? Now, we don't know ... What we've proven to ourselves over time is we don't know which ones are going to work. Again, that's a prediction that just humans aren't very good at. But we do know, if we pick the right qualities in those companies and we distribute that tail to enough companies, that we're highly likely to get a few. They're going to go from the tail and they're going to graduate all the way to the head of the portfolio with those range of outcomes that were once really wide, narrow down, and we're going to feel very comfortable owning that as a 3 or 4% position.

Brad: And I think what's important about this portfolio construction process where you combine the resilience half of the portfolio with the optionality half, is it's important to look at traditional risk metrics on a portfolio, but it's more important to look at what the fundamental risk of an investment is and then to balance that out across the portfolio. So the way this framework works is, say a very large position, 5, 6, 7, 8, 9% position in a resilient stock is going to contribute about the same amount of risk to the portfolio as a .5% position in an optionality stock. And so that's really important to know what the risk of the business is that you're investing in and what the range of outcomes is. The narrower the range of outcomes, the fewer the predictions that go into an investment, the more resilient it's going to be, the bigger the position.

Brad: Inversely, the wider the range of outcomes, meaning we think we have a sense about the way the world is going to play out, but we don't know for sure ... it could go this way or that way or in some completely unknown direction ... the smaller the position that should be. And a lot of mistakes you see in the investment industry are portfolio managers having, quote-on-quote, "conviction," around an idea and not taking into account the risk that that position may contribute to the portfolio or an individual. Stock basis ... So this was something really important that came out of complex adaptive systems. The biggest lesson on complex adaptive systems is you can't predict the future. You can look at a range of probabilities and outcomes, but if you are trying to pin down a specific scenario that things are going to play out, there's no way you're going to be right. And if you are, it was just pure luck. So it's really taking that luck out of the portfolio and being thoughtful about portfolio construction and the stocks that they go in.

Brad: And then one other comment on that is, the particular type of stock we look for, we call RWOOTMO, which stands for resilience with out of the money optionality. And so this is a business that has a particularly resilient core stream of free cashflow, but is able, through various different means, add on optionality to the business that you're not paying for and what the stock is priced at today. So we're ideally looking for

RWOOTMO. We're ideally looking for an optionality position that can graduate into a resilient position. But as Brinton said earlier, we're cutting out everything in the middle. It's not resilient or optional or a combination of those two, then you tend to strand capital in these businesses that could be put to better use in a stock that's much more likely to outperform.

Brinton: And just to tag on the end really fast and bring it home, when we first analyzed the portfolio and cut it these different ways between position sizes, one of the things that stuck out were a few mistakes that we'd made. And the most common mistake that we made that really hurt us the most was we took these optional positions where there was really a wide range of outcomes and, because of our research and conviction, which was really overconfidence, we made them resilient positions. And when something happened and the stock went down 50% for whatever reason, it really hurt us. So after studying that mistake that we made, we looked at a lot of other people's portfolios, too, and it turns out that's just a really common mistake that people make, which of course, didn't make us feel any better. But it did make us think, "Okay, what can we do to inoculate ourself from that mistake? Because this seems to be a human flaw."

Brinton: Of course, we know that overconfidence is a massive human flaw. And so that's when we really brought the team into this portfolio construction process and tasked the team with, of course, doing great research and all the things that a good investment team does, but also identifying bias in other team members. And so we gave them permission to say, "Hey, Brinton. I know you think this is a resilient business, but you've kind of just drunk the Kool Aid. This is actually not resilient. You have a bias. Maybe you like the CEO or you like the business model and you're always a sucker for this setup, or whatever the reason is." The team is really good at identifying that because it's really easy to identify bias in other people, but it's very difficult to identify bias in yourself. And when you give the team permission to help you identify bias in yourself, it's uncomfortable, but it's ultimately extremely helpful in terms of avoiding these types of mistakes where you put these highly option names as resilient and call it conviction or call it whatever you want. Many times, it's overconfidence.

Nate: Yeah. Can you provide an example of a stock, for example, that was at the tail and then moved itself up in terms of just how much you own, how much you wanted to own because of its resiliency?

Brinton: So a stock that would be classic resilience for us is a company called Amphenol. Amphenol is a connector company. So I hope that's vague enough. The prediction on a company like Amphenol, which sells connectors ... Connectors are in all electronic devices. That's how the semi conductors and the board and software all work together. They have these specialized connectors in them, usually in the guts of the device. So don't think about the USB port, but think about how the guts of the device are assembled. The prediction we're making with a company like that is a very broad prediction. We believe that electronics are going to push deeper into the world. Now, we would say that's a pretty narrow range of outcomes, right? So electronics are almost certainly likely to push deeper into the world. We've got the internet of things, we've got AI, we've got all these things, right? So very safe prediction. Then the question is, okay, well how do you express that idea within a company? Turns out, the connector market is a huge market. TAM is around \$70 billion, so very big TAM. The TAM being the total available market. Very big TAM. And then we look at the companies themselves and we say, okay, in that \$70 billion, about ten companies are half that TAM and about a thousand companies are the other half.

Brinton: So extremely fragmented, which we love because, of course, it gives companies that have a structural advantage, like Amphenol, a long runway of growth. They can grow with the market, which grows 6 to 8% a year, and they can grow through consolidating the market and taking those companies and adding them

under the corporate umbrella of Amphenol. And they do both extremely well. So that's sort of an example of a name that we will own, as a resilient position, probably for a very long time. Because the probability of us being right on a company like Amphenol, which has a very long runway for growth, this year is pretty good and next year is pretty good and probably give years from now, it's still going to be pretty good, because the runway for growth is so long, this duration of growth is so long. And with a resilient position, we think about this duration of growth a lot because, one area that we see people tend to get wrong is pricing and duration of growth for a company that has a legitimate shot at having a ten, 20, 30-year runway of growth. Now, these companies are not common, but they do exist. So that would be a great example for us. So I call them ARM Holdings, which is basically an IP semiconductor licensing model. It's an example of an optionality name. It graduated to resilience for us. It's now private, it's owned by SoftBank. But if it were as trading public today, we would take it down to an optionality again. So let me explain that a little bit.

Brinton: ARM provides the instruction set for lots of semiconductors that are in your house, in your car, and certainly in your hand because of your phone. All runs on an ARM instruction set. Now, back when we began to first own this, the big competing instruction set was X86, so that's Intel. Intel owns the PC market. But it turns out that Intel was so into getting a premium price, that they missed out on the mobile market completely. And really, that went to a different business model. So Intel had a business model in making a semiconductor chip and taking profit all the way down the value chain. Arm had a business model of providing an instruction set, licensing that instruction set as intellectual property to lots of different companies so they could all build on a common core. And then taking a small percent of the chip price back as payment. So usually between one and two and a half percent, at the chip.

Brinton: Now, that was really interesting to us and it was also highly optional when we first started investing because Intel was still Goliath out there and this was pre-smartphone era. Now, over time, that range of predictions narrowed quite a bit. ARM took the entire mobile market. Apple really consolidated around ARM and their application processor, as did everybody else. And then the range of predictions became very narrow. And so we ran that as a resilient position for a number of years. Fortunately and unfortunately for us, I guess, SoftBank bought that and took that stock away from our portfolio. But in the meantime, what we've seen is another business model come up. And this is an open-source business model. They're an instruction set called RISC-V. And so if we were to own ARM today, we would have that as an optionality position again, because the range of outcomes with the RISC-V coming into the forefront has widened again. So that's sort of a good example of how we would think about a stock in different time periods.

Brad: And ARM is a fascinating example because it's this business, as Brinton said, you went from a wide range of outcomes to a narrower range of outcomes, to a wide range of outcomes. And this is classic in technology and why a lot of investors find it hard or sort of want to ignore it or have someone else do it is this rising pace of disruption is ever rising and ever coming faster. And so another example of this, that's more of a household name than ARM, is Zillow, which is the real estate site that most people are familiar with, at least here in the US. And we had owned Zillow from the IPO in the fund that we used to manage. It started out as an optionality position because, at the time, it was relatively new to be finding a broker online. This is, I think, been around probably close to 15 years now. And so it seemed like we had the right idea. It seemed like a fairly broad prediction, but maybe you could go different ways. The real estate industry of realtors was sort of fighting it and I wasn't quite sure how it was going to go. As time went on, just through the culture and innovation at the company, they were able to effectively narrow the range of outcomes by building a better business and creating more value for both customers trying to do research on homes, but also brokers trying to find leads to buy and sell homes on behalf of those viewers on Zillow's website.

Brad: And so that, we were able to allow that position to grow from optionality to resilient. And then if you were to fast forward to now, again, it's similar to what Brinton described in the ARM situation, the range of outcomes for the housing marketplace industry in the US has widened once again. So this phenomenon called iBuying, where instead of listing your house and having another person buy it, you could sell it directly to an institution. There's a private company called Open Door that is well funded who's doing that. And Zillow has entered this market, themselves. Redfin, which is a broke, just partnered with Open Door. There's other private capital out there. As most people know, there's a lot of private capital in the market today with interest rates as low as they are. And so now, it's not totally clear how houses are going to get bought and sold, which is sort of a crazy thing to say because this industry has been around for a hundred years. And so now, the range of outcomes has widened. And despite so very much liking this company, and thinking it has asymmetry and resilience that it built, is potentially vulnerable. We don't know yet, but now the range has gone from narrow to wide. And what that dictates in our portfolio construction process is it needs to move from resilience back down to optionality. And so that's how we would navigate the pace of disruption.

Brad: There's some stocks we find that are truly resilient. And I think the example the Brinton gave of Amphenol is one of those where it is very difficult to see where the broad set of predictions could go wrong there. Whereas with both the ARM example and the Zillow example, they're simply more prone to disruption.

Nate: How is NZS different from the Janus Tech Fund? What is different about what you're doing now versus what you were doing there?

Brad: I think the investment philosophy is very similar. We're sort of learning by mistake, which is the way you become a better investor. And if we're not still making mistakes, that means we're not learning. And so we're still making mistakes, and we're still learning. And this complexity investing, to us, and this idea of applying complex adapted systems and the idea that it's very difficult to make narrow predictions about the future because an event that the stock market might call one in a hundred, we're probably going to treat it as a one in five or one in ten. We think fat tail events are much more likely to happen and our likely to happen. And so that is sort of a philosophy that is just ingrained in us and it's how we invest. And so we'll continue to invest that way and not only informs the companies that we look for but, again as we mentioned, the way we construct the portfolio.

Brad: And we're also very focused on innovative companies and growth companies. We're not looking for value stocks that are down on their luck, they're going to mean revert to some scenario where you sort of tend to ... and mean reversion is sort of another way of saying luck. Maybe it will, but you can't really predict the future, so how can you predict a mean reversion? It's not true of all situations, but it's true of a lot of situations that investors believe they'll get back to someplace that there's really no reason to believe that that's the case. We'll continue to invest the way we grew up and learned how to, continue to focus on innovative companies, whether they're in the tech sector or more broadly in the market.

Nate: It's funny, you talked about value. And I've got this really good buddy of mine who knows that I work in the industry and he also knows that I just primarily focus on energy, industrial value companies. But he always asks me about tech stocks and, "What do you think about Uber? What do you think about Google? What do you think about Facebook?" And I just have a hard time coming to grips with some valuations out there, within the tech space. And I'd be curious if both of you guys would be willing to share your thoughts on, first of all, how you guys value a stock, what's intrinsic value for you guys, and then just your thoughts on the overall valuation within the tech space.

Brinton: Maybe I'll just start to answer that question by taking you through our lens companies. For anyone following along in the paper, this is Chapter Three, which I would recommend. But really, we look at three broad lenses. One is quality, second is growth, and the third is context. And so I think this really applies to investing overall, but let's just put it in the tech investing landscape. With quality, we're thinking about the management team. What kind of folks are running the company? We score the management team based on several factors. They're all located in that paper, if you want to read more. We're really looking for a culture of innovation and long-term thinking. And we want management teams that are treating this business like it were their own. Preferably, we want it to be their own. We love founder management teams, family management teams, things like that. With growth, we're looking at the nature of growth. So value and growth are two sides of the same coin. Meaning, a company can grow its way into value very quickly and, of course, if it's not growing, then we call that ... and things continue to get worse, we call that a value trap. So these are two sides of the same coin. So we look at the nature of growth. And really, what we're looking for in that nature of growth is a negative feedback loop that will tamp down the speed of the growth, but elongate the duration of the growth.

Brinton: So what does that mean? Let's take a stock like Granger. Granger ... sorry, not a tech space ... but operates in a catalog business that does things like gloves and industrial supplies, things like that. That stock has grown their operating income by 13.2%, I believe, from 1962 through 2012. That's an extremely long duration of growth. Your probability being smart is great in 1962, it's great in 1972, it's great in 19 ... We can go on, right? So it's not something that you might hear on TV or read in the newsletter and say, "Oh, I've got to buy this today." But because the duration of growth is so long, you can make money for a very long period of time. Now, what leads to that kind of duration of growth? Well, in Granger's case, it's a catalog business. It's very fragmented. There's always a negative feedback loop of adding a new supplier, which is painful for the business because they have a set way of doing things. But when they change, it turns out that they're very sticky. So there's lots of businesses like this that have a negative feedback loop to the duration. But once they get in, they're in for a very long time. So the negative feedback loop is really important to us in the growth piece. We don't want to see companies that are growing too fast, that have no duration to that growth.

Brinton: And then, of course, within growth, we think about the type of growth. And this is where NZS comes from. We think about, are they creating real non zero sum? So you look at a company like, maybe, Groupon. Groupon grew very quickly, but really the core business model is discounting their customers' products to other people. So that's not a great place to come at it right off, because the client doesn't really love them because they're already discounting their product. So then the question is, well, do they create sticky customers for me? Turns out, the answer was not really. So the nature of growth was not NZS.

Brad: Yeah. It probably wasn't a negative sum but it was, at best, zero sum. So Groupon was creating more value for themselves and for their ecosystem, and those businesses just ... they don't always crash as quickly as Groupon did, but they eventually fall apart.

Brinton: Exactly. So we always have this NZS discussion about the nature of the growth. And the last one is context, and that's where valuation fits for us. So we think of context as, does the company have everything that we like? Or they're selling buggy whips when the automobile is coming online? So that would knock it out. And then, of course, the valuation is important because the valuation forces you into predictions. If the valuation is low, you're forced to into fewer predictions. If the valuation is high... many SaaS companies now are trading

at 20 times sales, that forces you into narrow predictions. So again, we may own a company that is very expensive like that, but we're certainly going to size it relative to the predictions.

Brad: And this last point, I think is really important because it's not that we shy away from hyper-growth companies. We'll own a cloud software company who's growing revenue is at 50 or 60% a year, trading at significant multiple of revenue, maybe doesn't even have free cashflow yet, or their free cashflow is very small. But if we think there's a range of outcomes where this is likely to still become a better business over time, we'll still own it, but it'll be very small. This something I think you see a lot of portfolios get wrong, this sort of sexier higher-growth stuff. They'll put it at the top of the portfolio and they'll think that this will just continue on and on through its own momentum. And it's usually not the way it works.

Brad: But if you have it at a small position and the company stumbles for a quarter or valuation comes in, it's easy to bring the position up. And a lot of portfolio managers are uncomfortable with .2%, .3% positions. They feel like they're not owning it big, then they're sort of not doing it right. We're very comfortable with small positions and we're very comfortable about running a long tail, we're very careful about making sure that tail is productive and everything in that tail is asymmetric still. And if something is losing its asymmetry, it comes out of the portfolio. But we're comfortable owning small positions if the risk of that position is high, as long as the asymmetry is still there.

Nate: And what about thoughts on just the market in general, right now? Is there something that sticks out? Do valuations stick out to you right now?

Brad: Yeah. It's hard to put a timestamp on an opinion about the market, but we do obviously have views of it. And I think you have to really break it apart and not look at tech, holistically. So maybe let's start with the biggest in tech, which is the mega platforms. It would be Apple, Facebook, Alphabet, Amazon, and those companies. This is a group that has led the market for the last decade. I don't know what it is. I think it's been responsible for half of the performance of the S&P 500. It's a lot. So just let me double check that number. But a small number of stocks has been responsible for a large part of the market expansion over the last decade. And that has caused government to catch up to how much market power they have, and government does this all the time. It moves very slow and tech moves very fast. And other sectors move very fast, but eventually government catches up, whether it's the oil industry a hundred years ago or whatever it is. Government catches up and they've caught up to tech.

Brad: And so now, you have to look at a whole new set of risks that come into play. So the range of outcomes for these mega-platform stocks went from fairly narrow to quite wide in the last year. And they could even go wider. And so they have these resilient core businesses. Apple, the revenue stream, we're on the iPhone and the ancillaries and the App Store and Google with search and YouTube, and obviously Facebook and with Instagram, and WhatsApp and the core Facebook platform on Amazon around delivery and AWS. Those are still, we think, resilient businesses, but their ability to stack a new growth curve on top of that has now changed. And so are those companies cheap? Are they expensive? Well, you've got to look at what will the growth rate of that core business be, going forward? And all of these companies have added new growth curves over the last decade and it's going to be a lot harder over the next decade. So this is a big percentage of tech and internet market cap. Probably 40 or 50% is in this handful of stocks. Certainly, if you throw Microsoft in there, it's probably close to 50% of the market cap in US tech. You have to question, is that going to be the leadership route for the next decade? The way it has been for the last decade.

Brad: And then moving on to the other big areas in tech, so let's go to software, which has been probably the hottest sector in the west. Few years, this is the shift to the cloud is actually still early, but they're expected ... this group of well known phenomenon that's happening, even your generalist PM or, in some cases, you're seeing value portfolio managers decide that SaaS software companies might be value stocks. So we like the SaaS business model and have been invested in it for a very long time, but the starting point matters and the rate at which these stocks might compound, even if the business is still compounding over the next five years, probably not going to be the rate that they compounded at over the last five years. Doesn't mean there aren't still great values to be found in the software space, because we think there are, but you have to become very selective now. Sort of the rising tides are lifting all boats there and that may not be the case going forward. So those are two areas where I sort of just mentioned that are a lot of the hype in tech that ... it's not that we're cautious or negative on, but I think you just have to question, are these going to be the market leading businesses of the next five or ten years?

Brad: And then maybe moving into hardware and semi-conductors, do you want to talk about that group?

Brinton: Yeah. We see businesses like semiconductor businesses, which are perceived to be highly cyclical and to be sure there's a cyclical element to them. But at the same time, they're also highly valuable, meaning the world does not work without semiconductors. The world does not work without foundries. It doesn't work without software that skews to design the semi-connects. And so we see valuations there. And like, maybe, the heightened SaaS valuations, we see them very reasonable. And we look at these and, of course, there are threats like the trade war with China and what will that do to growth. But at the same time, we're extremely excited about the next decade for semiconductors. And this goes from a very broad prediction. We believe electronics are going to push deeper into the world. We believe there's a few companies that are going to lead that. And of course we have our reasons, but that would be an area that we'd be a lot more excited about.

Brinton: Let me just add that, as we sit here on August 29th, 2019, there are a lot of reasons to be scared about the overall market. Of course, there's an inverted yield curve, we're seeing RV sales fall off a cliff, classic care sales are going down, high-end home sales are going down. So all these are reasons to be scared. Will there be a recession? Of course, we don't know. It's not a prediction we're comfortable with, we just don't know. And anyone who says they know is probably trying to sell you something. So we don't think about that near as much as we think about the types of companies we hold in the portfolio. I remember in 2009, still early 2009 before the market snapped back, when all the demand data was terrible. We talked with Rich Templeton. He was the CEO of Texas Instruments and he said something like, "A recession is a terrible thing to waste," which, of course, makes you want to punch him and hug him at the same time because it's painful being in a business during a recession and, at the same time, that's exactly the type of company you want in your portfolio.

Brinton: So instead of thinking about what's going to happen, we think a lot about the ability to adapt. Has this company shown us, in the past, they're very good at adapting? And what we really want is a portfolio full of companies with management teams that say, "Ugh, we have been waiting for this recession. We are going to take so much market share." And you look at a company like TI, they came out of the recession, they really set themselves up for the next ten years of growth because of what they did in that very narrow range of time. So those are the kinds of things we're thinking about. Does this company have the ability to adapt? Have they shown that in the past? How did they do that? What does that mean for their duration of growth?

That, to us, is much more important than the jigs and the jags on a monthly or annual basis because, at the end of the day, we just don't know.

Brad: We spent a lot of time trying to understand this culture of adaptability. It's probably one of the first things we look for. It's not just getting to know the CEO, but it's the whole like employees, what do their customers think about them and what do their suppliers think about them? What do their competitors think about them?

Brad: That Texas Instruments quote reminds me of another quote from a CEO, and I won't give the name of the company because he probably wouldn't want me to, but I said, "It looks like we're going into a potential downturn in this segment of the market that you're operating in. How are you guys thinking about it?" And there was this short pause and he said, "We're going to feed on the blood of our competitors."

Brad: And the culture of this company is just scrappy and adaptable. It's just the kind of thing when you can find it, it's very difficult to determine a company's culture as an outsider, but when you can go to their user conferences or trade events or just anywhere that's sort of off the beaten path and we're not running into other investors, but we're meeting employees and everyone else in the ecosystem and just get this sense for ... because companies are just living organisms and they grow up, and they have setbacks, and they have great things happen to them, and bad things happen to them. And it's how that organism flexes and reacts without breaking. And a lot of companies are just not flexible and they break when disruption or innovation comes at them from a competitor, and they just can't react to it.

Brinton: Because companies are living organisms, they're really best understood in this complex, adaptive-system realm. One of the things that is key, for us, is we think very of fat tail outcomes as not that uncommon. So most of the world, it seems anyway, seems to think of outcomes on a bell-curve basis, meaning most things happen within three-center deviations of the mean. We think that's crazy. We think that's insane. In fact, outcomes and complex adaptive systems don't happen in a bell curve, they happen in what's called a power law. That means a lot of stuff that really governs the whole behavior of the system happens in these fat tail events.

Brinton: And so a key for us, and Brad said it earlier, is maybe someone else thinks this might be a one in a thousand outcome, we think it's one in ten. We would just give that much more weighting and that's really key to understanding how we think about the world.

Nate: Do you mind just walking through the concept, the mental model pace layers, and then just creep into your point? What you said just a second ago, Brad, about innovation. Just how innovation may be impacted by ... and I'm sorry if I'm stealing the punch line here ... but the potential government regulation and potentially breaking up some of these big tech platforms, what that might do to not only the company's evaluation, but the ability for companies to innovate. I'd really appreciate to hear your thoughts on that.

Brinton: Yeah. Well, on the pace layers in particular ... This is a mental model we stole from a guy named Stuart, Stuart Brandt. And it's on our NZS Capital website, if you'd like to read it. The way it works is this; if you think about these different layers as gears, then you have this fashion layer up top that moves very fast. Meaning, you can be in fashion one year and out of fashion the next, or the next month or whatever. You have a commerce layer under that that moves a little bit slower. Infrastructure moves even slower. Governance in glacial in its speed. Culture doesn't change ... it may change over thousands of years, but probably not within tens of years. And then nature itself changes the slowest. So we think about these as layers of change.

- Brinton: And this is a great example of Brad and I working together. So I had sort of had a thought about regulation and using pace layers. I didn't really know where I wanted to go with it. Brad put some more meat on the thought for me and then we iterated that back and forth. And really, we didn't know where it was going for awhile, but I'm pretty excited about where we ended up because we ended up in this space I call the, 'duh space.' It was like, "Oh, that's so obvious. I can't believe it took us so long to get there." But when we look at past big platforms, maybe Microsoft is the easiest one, you look at how powerful it became in a relatively short period of time. And then it took a long time for governance to catch up but, when it finally did, it really inhibited their ability to get into adjacent businesses. So Microsoft missed out on the phone because they were pretty hamstrung by the governance layer to get into the mobile space.
- Brinton: So what we're really saying with pace layers is we think governance has caught up with these platforms and we think it's going to make their life tougher to stack new businesses on top of their existing business in the future.
- Brad: The flip side of that is government regulation can actually cement their current businesses. And so, for example, GDPR, which is a European regulation around data privacy, has actually made it hard for smaller companies to serve ads to users across Europe and it's made Facebook and Google's business stronger there. So regulation can cut both ways. We don't see it necessarily damaging the current business that any of these platforms are in. We think it makes it very hard for them to enter new businesses, which has been important to their growth over the last decade, whether it be Amazon entering Amazon Web Services in the hosting space, or what they're doing in logistics with Whole Foods, whether it be Facebook which acquired Instagram and WhatsApp. Apple, which has expanded into multiples categories, now there's questions around the monopoly power of the iOS App Store.
- Brad: And Microsoft had this ten year, what's called a consent decree from the government saying, "You basically can't do anything adjacent." And so I think other execution issues led them to missing mobile, but had they really wanted to get into mobile, they may not have been allowed to. It can basically turn a culture of innovation into a culture of fear where you just are afraid of doing something that might trip up the government or be perceived as wrong by your customers or be perceived as unfair, even though maybe you're still providing more value to your customers doing that, but it's going to be perceived the wrong way or the government is going to stop you from doing it. I think we're much more likely to be operating to that scenario for the next ten years for these companies, similar to what happened to Microsoft between around 2000 and 2010.
- Brinton: What's counterintuitive to this perspective is it actually makes those companies more resilient to the current environment, so meaning it really entrenches them in the current environment and they can operate their core businesses and do very well. But it does make them more fragile to, what we call, phase shifts. Mobile was a phase shift. This move from client server to cloud SaaS is a phase shift. So you see a company like Oracle, which dominated in the client server world, which has had a very tough time making transition to the cloud SaaS world. So counterintuitively, we think a lot of the governance will make their existing businesses very resilient, but more fragile to something new coming along.
- Brad: And some of those phase shifts are on the horizon. They're not here today, but augmented reality is quickly becoming a new way of interacting, these early things that Android and iOS are doing with that. But it could be that a whole new platform emerges in augmented reality that's not Apple and it's not Google. We just don't know. Voice interaction as a user interface is a platform shift from text and multi-touch to voice and

video interaction. It's a platform shift. We don't know if the current winners will be the next winners. Artificial intelligence, which is starting to impact everything, is another shift in the usage of data, the collection of data, and the usage of algorithms. We don't know if the incumbents will be the leaders of AI like they have been in prior things.

Brad: So there's big phase shifts coming in technology and it's why we sort of fall back on this view of complex adaptive systems, resilience and optionality, portfolio construction that takes into account the risk of each individual stock because some of the businesses we thought were the most resilient can end up being vulnerable, some of the examples we've gone through today. And it's just important, as tech investors, to be hypersensitive to that disruption and make sure that you're taking risk into account appropriately in the portfolio.

Nate: There's this big conversation that politicians are having right now about breaking up tech, and I think you guys have written about ... you've shared your thoughts on what you think should happen and I'd love to hear them here.

Brad: I think our concern around tech regulation is that, in the US and Washington and the across the EU, the frameworks being applied to tech companies are similar to the frameworks that were applied to industrial companies. An oil monopoly a hundred years ago is a very different business than a search engine. Not just because it's a technology business, but ... and these businesses are so intertwined in the economy and the world runs on smartphones now. Anything that doesn't run on a smartphone is going to run on it soon. And so it's really complex. And so to just come at it and say, "Oh, let's break up Facebook and let's separate on Instagram," it's not necessarily a logical way to approach it. And I think that they'll probably come around to that, but you need to think of it in more of an information-age lens than an industrial-age lens. And in the information age, we have network effects increasing returns.

Brad: So the more market share Google has in search, the better the search product is, the better the user experience and then the better the search product gets. And you see these flywheels of these information-based businesses. And breaking apart a flywheel may just simply make everybody worse off. It would cost \$10 billion a year for a new company to get into search, probably. It's not necessarily grounded in reality, but it's going to cost a lot. It's not a couple hundred million, it's many, many billions over a course of many years to do that and it wouldn't necessarily be a better product.

Brad: So then you say, well, we need to think about regulating access, and what can they do? What can they not do? And that's a more thoughtful approach to regulation than, "Let's take YouTube out of Alphabet." What have you really accomplished by separating WhatsApp from Facebook or AWS from Amazon or the App Store from Apple? These aren't logical ... We keep hearing these out of Washington and the EUs are breaking up. But other ways you could do it, certainly opening up the platform, making the data available. So maybe we don't need to know Google's search algorithm, but any of the data that they have, anonymize it, make it available so that someone can build a business off of it. Take the social graph that Facebook has, anonymize the data, make it available for someone to build another social network off of. That would be a potentially more fair way to not damage the benefit you're getting from these network event platforms and the benefit society is getting from them, and yet, enable new competition.

Brad: So you would have this, call it sort of, data democratization. We think that would be a really interesting way to approach internet regulation. We don't see a lot of people talking about that, but we hope that we will.

And we have a separate paper, separate from the pace layers paper, where we talk about this idea of how do you regulate an information-age business? And you have to be really careful because you could do a lot of damage.

Brad: And to go off on a little bit of a tangent, we're sort of entering this artificial intelligence cold war between the east and the west, sort of an ideological battle. I hate to speak in generalizations because it always comes down to the individual, but right now there's a view of how you use artificial intelligence and facial recognition, say, in China, that's very different than the view of how you'd use it across the EU or in the US. China is gaining a significant lead in artificial intelligence because they have a different approach to what data is used. By the nature of artificial intelligence and the way it gets smarter and iterates on itself, a small lead in artificial intelligence leads to an impossible-to-catch lead. And so if you're a year ahead, you could get ten years ahead.

Brad: And so I think it's important that we don't overregulate western businesses and that the whole world has thriving ecosystems of internet platforms, whether it's here in the US or over in China, that are competing against each other and getting smarter and getting better. And to come in and break apart a US or European company just seems like a dangerous thing to do when you have this sort of escalation of artificial intelligence that will really be the center of everything going forward.

Nate: I want to be as sensitive around this as I can, but are you guys saying that from ... I'm assuming that's both of your views, but are you saying that from an investor's perspective or are you saying that from a father's perspective?

Brad: The thing is, though, I think it's from society's perspective.

Brinton: From an NZS perspective, yeah.

Brad: Yeah. I think we need to be careful about damaging institutions that have created so much innovation. And sort of going backwards in our economy in the west, I don't think that serves anybody. I think all economies should move forward, whether it's us or China or in Europe. I don't think anybody should move backwards. And I think the best way to move forward is to be thoughtful about regulation. It looks to us like probably the best way to be thoughtful about it is this idea of data democratization as opposed to these ideas of breaking up a business or taxing it. It just feels very 1900s and it's just not the way the economy operates today. And part of it is, we don't really know how the economy operates today. All the way we measured GDP and all of these metrics, it's not capturing this shift in the labor market that the smartphones have enabled for on-demand delivery or things like that. We're just not capturing this stuff. It doesn't capture the fact that we're getting so much more benefit out of a \$15 Netflix subscription than we were getting out of an \$80 cable subscription. How do you capture that accurately in the data and around productivity?

Brad: And so we're just in this really interesting time where technology is creating this new digital operating system for the global economy and we just need to be really careful with how we navigate that.

Brinton: Yeah. And let's be clear, great things can come out of big companies. So we look at AT&T, one of the most heavily-regulated companies over the past hundred years or so, and we look at what happened at Bell Labs in the 1940s. They created the semiconductor, they created cloud cloud chain, they created information theory. The world doesn't work without semiconductors and information theory. The information age would

not have come without them. But they were able to because they were doing pure science. They had the scale to do that and they created something amazing for the world. So it's not always so simple as just, like Brad was saying, busting apart a company like, maybe, Standard Oil and then taking some of the power away from it. It's gotten more complex than that.

Brad: Just to give another example that's been in the headlines lately is Facebook's wanting to get into the currency market. They're trying to create a transactional currency and the reaction to that from the US and Europe appears to be sort of a resounding, "Hell, no. You can't. You're a social network. You have this big position of power. You can't just create a currency." That's probably not the right reaction. Maybe the right reaction would be, "Okay. You have billions of users, you have a lot of data. You have an app called WhatsApp that can become a transactional app as opposed to just a communications app. So why don't we make it so that anybody who wants to create a currency, and it can be a choice in WhatsApp, can do that. And you can take your data and anonymize it and they can leverage that and they can maybe use your platform. And you can create your own currency. You can't advantage it on your platform, but if it's the best one, then people will choose that one. But maybe there'll be ten others that'll have different uses cases that can sort of thrive in that."

Brad: That kind of open collaboration is just, I think, a much better way to approach regulation than just saying, "Oh, no. You can't get into currency because ..." Well, maybe having a transactional currency on a communication app is really good for the economy. If we're just going to not run that experiment, we know that China has already run that experiment with Ali Pay and Ant Financial, which is part of Alibaba and WeChat and Tencent, and they've seen huge benefit to the economy in China by allowing communication tools to get into the transactional marketplace. And so, let's not just kill that experiment in the west just because we're afraid of the power of these big platforms.

Nate: Yeah. So you mentioned China a few times and you mentioned the pace layers paper that the Chinese government is really spearheading, or they're really pushing for more innovation, whereas here in the United States, we've been going the opposite direction of giving potential regulations down the road. What is China doing right that maybe the United States politicians should maybe look to and learn from?

Brad: Well, part of what China has is they were able to skip several steps. So they didn't have to build a huge landline telephone infrastructure, they could just build out wireless. In some cases, they had some landline, but they just didn't need to do that. They could just go straight to wireless for most of it.

Nate: I never really thought about that.

Brad: Yeah. There's a lot of things that emerging economies can just see what happened in developed countries and just say, "Oh, we'll just go ahead and skip. We don't need that one. We'll just go to the next thing." And because we're such a global economy now, you can get access to that technology and roll it out. So part of it is just the benefit of becoming more advanced in the last 20 years as opposed to 50 years ago. And India will go through that, as well, as they build out infrastructure. So that's sort of just the timing of it. I think in terms of what the government did that helped their internet platforms move ahead of the western ones, in some cases, is they just let them get into transactional payments. There wasn't some sort of, "Oh, we have to go get a banking license and then we're going to come in and regulate this and regulate that." I'm not saying there's no regulation in China. There's probably more than we have, but a different approach to it. And then it's just different, culturally, around the use of data. And understanding that we're seeing as China is getting

a little bit more heavy handed on regulation. They've recently come in and done a lot in the video game sector, a lot of regulation. They're taking an increased interest and, in some cases, ownership in several of the internet platforms. And so they may have sort of let this experiment run for five or six years and then decided they need to get their hands around it a little bit more as the economy has grown, as they continue to try and bring people up the income ladder in that country.

Brad: And China is just a very complex situation. It's difficult to analyze. It's simply culturally different. It's not that it's un-analyzable, but there are different risks to investing in China than we have in the US because, although they've sort of paradoxically removed a lot of the barriers to innovation, they're still very much in control of the economy and of what goes on there. So they're running a lot of experiments now around facial recognition and monitoring of their citizens that I think we would be uncomfortable running in the US. I'm certainly not saying, "Let's just remove restriction and let's go crazy with facial recognition in the United States." That would be a mistake, but it's interesting to just see how they've taken a different approach.

Brad: Another thing they do in China is ... It's obviously a big country which means there's a lot of big cities, and many cities with tens of millions of people in them. It allows them at the local and regional government level to run different experiments. And so it's a really interesting approach to running an economy is it'll allow you to say, "Well, let's let this region try this out, let this region try this out, and this region try this out. Whichever one looks like it's best, then we'll roll that out across the other regions." That would be a really welcome and refreshing way to see the west approach innovation and government interaction of tech companies. But it would be so hard to get there from where we're at today, being a fully-developed economy with trillions of dollars of bureaucracy in it. You can't just sort of wipe that out and start running experiments.

Nate: Yeah. And I'm talking about what you guys have been writing, and maybe we should just talk for a moment about what it is that you send out every ... is it both of you guys that put it together? Or is this Brad's baby?

Brinton: It's Brad's baby. I don't know how he actually does it. I have accused him of cloning himself. But the amount that Brad reads and the speed at which he assimilates it and writes it is really incredible. So, no. This is 99.9% Brad.

Brad: So we have a weekly newsletter called, "Stuff I Thought About Last Week," which I called SITALWeek, because basically I'm sitting all week and reading, and sort of the acronym. It's basically just my process for finding interesting ideas or keeping up on ideas that we're already invested in. It's just reading from as many sources as possible. And this is one of the ways I was trained as an analyst at Janus, 20 years ago, which believe it or not, there was the internet back then but it didn't have the information on it that it has today. So it meant subscribing to, what we called, trade magazines, which still exist but mostly in online format. This would be the I-triple-E spectrum for engineers. Reading an article, something is interesting, somebody is quoted, trying to find that person, trying to look up their phone number, call them, go to a conference that you see mentioned, look at who's sponsoring the trade magazine, look at the conference, it looks interesting, go to the conference. So I think that's where it started from. And then, as all of this stuff moved online, it became this fire hose of information. And so there's a lot of noise, but I think I've just been doing it long enough that I'm able to try and pull some of the signal out. And so SITALWeek is just simply stuff that I thought was interesting, that made me think in the week prior. More than half of it is usually around tech and innovation for the tech sectors and other sectors. Part of it is on macro and geopolitics, which is the least important part but is just sort of interesting and I read a lot about it, so it gets thrown in at the end.

Brad: I write about what's going on in the finance industry, which is one of the industries most susceptible to disruption. Asset management in particular over the next ten years with the shift to passives. And then there's the miscellaneous section, which tends to cover a lot of topics in astronomy and neuroscience, behavioral science, or media, movies I watched or podcasts I listen to, or books I've read. So it's fun. It's part of our philosophy of, we're certain that the more we give, the more we get back. And so it's why, when we created complexity investing and the whitepaper five years ago, we published it right away on the internet. And we've gotten more back from that than we ever could've gotten from keeping it to ourselves. It's the only way we learn. And it's the same thing with the newsletter. It's the same thing with the other whitepapers we publish. Same thing with activity on social networking, Twitter and LinkedIn. We meet interesting people, we get new perspectives, we find out we're wrong because we're wrong all the time. Having this ability to share and teach people about the way we think about the world and hear their perspectives on that, and then integrating that and making it a better process, we think it's just kind of the way business is done now. So it's sort of a cool part of NZS Capital that we do that. So the newsletter goes out Sunday afternoons or Sunday evenings and you can sign up for it through the NZS Capital website, or find me on Twitter for that.

Nate: How long does it take you to ... is it something that you just sit down on Sunday and write it or is it over the week?

Brad: It's important that I ... So it goes out on Sunday because I try to have several days of reacting to something before I write about it because, often, my opinion changes or I'm wrong, my initial opinion is wrong or new information comes out. So it's usually things that happen the prior seven days leading up to about Thursday or Friday. So I start writing it on Thursday or Friday. Usually, on Fridays and have most of the draft done on Fridays. And then we do the editing over the weekend. And believe it or not, it starts out much longer than what actually gets sent out and gets edited down quite significantly. Whole sections are usually taken out of it every week.

Brad: I have an entire document of things that have been cut from SITALWeek that I add to every week. But it really is just my process. It's just sort of how I research and invest. So it's sort of just open sourcing of my process. And every time it goes out, every week, I get feedback or something interesting to look at or a question that makes me think, usually multiple questions that make me think, whether people email me back directly or ... The best thing is when people ask me the question or raise an issue or debate me on Twitter, because then it's an open debate and a hundred people can chime in and tell me I'm wrong if they want to. And then it's incumbent upon me to figure out, okay, am I wrong or am I right? And if I'm right, but I can't explain it, then I'm probably wrong.

Nate: So another very headliney topic right now is Huawei, and I know you've written about it. And just given the fact that you guys know the tech industry better than most people ... I don't know where to start this question. Is there anything that you feel strongly about when it comes to the whole Huawei debate, banning it here in the United States? 5G ...

Brad: There's something about the way the US is negotiating the trade war right now, which I would call, crazy like a fox. I think the simple fact is, the vast majority of the semiconductor intellectual property has been created and resides in the US. The software that you need to design semiconductors are US companies. The tools that you need to make semiconductors are US and European companies. And the plants that you make semiconductors in, particularly the leading-edge semiconductors, are in the US, Taiwan, South Korea, and maybe to a lesser extent, Japan and Singapore. So this is really core to US intellectual property. There has

been evidence of Chinese companies copying or taking US intellectual property in various industries. Many, many years ago when I was a young analyst covering Cisco, I think, back in 2003 ... I might have the year wrong on this. There was a lawsuit between Cisco and Huawei, where Cisco had taken the source code of a Cisco ... Huawei had taken the source code of a Cisco router, copied and pasted it into the source code of a Huawei router, including typos and things like that. So this has been going on for a really long time. It's not a false accusation or anything like that.

Brad: Eliminating a company like Huawei's access to semiconductors just cripples it, despite what they're saying publicly that they can work around this. China is sort of running the biggest, I guess, Harvard Business case study in realtime, which is they're taking \$50 to \$100 billion and saying, "Can we recreate the semiconductor industry?" I think the answer is no. It's not just recreating it. This stuff is really hard. The scale at which these semiconductors are made are running into quantum mechanical effects at the small end, thermal issues. The workarounds are becoming more art than science. And you can't just sort of say, "Well, we'll just throw money at this and fix it." 50 years from now, maybe. It's much better for China to cooperate with the west. They need semiconductors for artificial intelligence to run. Alibaba needs them, Tencent need them, the government in China needs them, Huawei certainly needs them. And so to the extent this is a crucial period in the innovation happening in semiconductors, this is probably the right time to be pushing this issue. I don't think anything I've said is overly political, so far. I think simply that we have something important to them, they have things that are important to us in our economy, and this is a good time to get that worked out and make sure that the intellectual property of US and European companies is protected.

Brad: Yeah, well coming back to Brinton's comments earlier on the semiconductor sector, one thing the US trade war with China tells you, and the restrictions that have placed on Huawei, is that semiconductors are really important. The economy, globally, now runs on semiconductors. There's a handful of companies in the world where, if they were gone tomorrow, we wouldn't have semiconductors and then we wouldn't be able to support the economy once our current semiconductors broke. They don't last forever because these things are run pretty hard. So if a handful of companies disappeared overnight in the semiconductor supply chain, basically, the economy grinds to halt, 18 months from now and it'd be pure panic. And so the takeaway from this trade war is, well, the semiconductors kind of seem important. And then we step back from that and go, "Wow, there's companies we've liked forever that have these really, really great businesses that fit all of our criteria of our framework." And then we would expect to say and go, okay, well everyone knows semis are important and here are these great companies, so they should be really expensive. And they're not. They're sort of trading cyclical, low-growth businesses because of all this fear in the market. And we love fear because fear is what, as Brinton said, creates opportunities.

Nate: What are those handful of companies?

Brinton: I think this is really not well understood. By the way, just on Brad's last point, another word for fear is volatility. Volatility equals risk in most people's view of the world. In our view of the world, volatility does not equal risk. It equals opportunity. So we're really excited about the volatility. Kind of maybe like what Rich said to us one time, "Recession is a terrible thing to waste," we think volatility is a terrible thing to waste. What I think is not really well understood is how concentrated some of these companies are. So we often ask ourself, "Hey, if a nuclear bomb fell on this company's headquarters and sort of wiped it out and it was able to follow the branches and wiped out the whole company globally, would it matter?" And there's lot of companies we'd say, "Not really." When I think about it that way, not really. But in the example of semiconductors, there are a few companies that really matter. So one company in Europe, ASML, makes all

the leading-edge lithography for the world that allow Moore's Law to take place. You wipe out that one company, you put the world back a decade, two decades. I don't know, a long time. TSMC is a foundry located in Taiwan.

Brad: 70% of semiconductors go through the island of Taiwan. A fraction of those go through the company of Taiwan's semiconductor.

Brinton: Right, because back end is a big piece. Thank you. So it makes Taiwan incredibly important in this geopolitical sort of escalation. But it makes it incredibly important. And to think that Taiwan is not at risk or important is naïve, in our opinion. So TSMC is massively important. Samsung, which is located in South Korea, makes half the world's memory. So without Samsung making out, the world doesn't have smartphones. It doesn't have flash memory for lots of applications, like the data center. It doesn't have DRAM for computers and cell phones and on and on. We look at a company like Xilinx, who makes FPGAs. FPGAs go into virtually every communication device for cellphone towers for lots of things. Huawei definitely needs access to FPGAs. There's really two companies in the world that make them. One was bought by Intel and is now part of Intel, and the other is Xilinx. These are the only two companies in the world that make these types of semiconductors. They're incredibly hard to make, mostly it's because the software is so hard to build and that's been built over 40 years. And there are also fabs, in the case of Xilinx, at Taiwan semiconductor, TSMC.

Brinton: You look at companies like a GPU company, like in Nvidia, they make graphics processors. Graphics processors were kind of cute for a really long time. Intel actually made most of the graphics processors. The rest of them were used by high-end gamers. But now, every data center in the world depends on them. AI, wholesale, depends on them. Autonomous driving depends on them. You can go on down the line. They're incredibly important to the world. And that is primarily being driven by one company. AMD has another company inside of it they bought a long time ago that is also relevant. But really, it's one company that's driving the innovation in the world. And we could keep going like this, but these are companies that, if you nuked them, it's not that it would set the world back a year or two. It would set Moore's Law, which of course it what semiconductors and what the economic benefit of semiconductors is driven by, back by a decade or two.

Nate: We have mutual friend who wanted me to get you guys to comment on China possibly just taking over Taiwan.

Brinton: Well, we don't know because humans are bad at predictions. What we do know is that the world doesn't fall into bell curves, it falls into power laws. So you might ask a thousand people that question and most of them would probably say that's just craziness. By the way, did you see that we just sold Taiwan all these jets? And whatever. We would say, well, to discount that out of one in thousand would be insane. One in ten doesn't seem aggressive enough, almost. So I don't know what the odds are, but it's not one in a thousand. It's probably greater than 10%. It's certainly not zero.

Brad: So just to provide some more background, Taiwan is an island off of the coast of China, between China and Japan. It's a very large population. Taiwan itself and the rest of the world considers it its own sovereign nation. China considers it part of China. There's a lot of history to it, which we don't need to go into. But because Taiwan is so important to the semiconductor supply chain, to the extent the trade war pushes China back far enough into a corner that it becomes an existential threat to them, they in theory, based on their view of the world, are already in possession of the country that makes most of the world's leading

semiconductors. Also, the US would have a hard time getting by without the semiconductors coming from Taiwan. Although we could with South Korea, the US, and then Japan, rebuild that capacity somewhat quickly. And so we have the intellectual property do it. But it's just become a difficult situation to analyze.

Brad: And so when we come across this, I think almost every investor you would talk to would put this at a one in a million. We don't know what the probability is on this, but we think the fact that the trade war is ongoing, and the fact that China is being pushed further back into a corner, creates a wide range of outcomes for what could happen with Taiwan. Could there be a military event? How would the west react to that? We don't know if ... China's very sensitive to this.

Brad: Some people might have seen in the news, in the last year, that China went to the global airlines such as United and said, "We see on your website you list Taiwan as a separate country. We do not view it as a separate country." The airlines had to respond by just listing Taipei or the cities, and not listing it as separate countries. Trump even reacted to this and said, "You can't tell us what we can call a country and can't a country." Recently, a major European fashion house printed designer T-shirts that listed the places they have stores and they listed Hong Kong as a separate country. That was also very sensitive to China. They had to come out and publicly apologize. Their Chinese celebrity sponsors in China dropped their contracts with that luxury brand over simply calling Hong Kong its own separate entity.

Brad: So China is very sensitive to this. This is not something they view as silly. They view it very seriously and some of it could become a military conflict very quickly. They're treating it that way, the US is treating it that way, Japan is treating it that way. And so what does that mean for putting a portfolio together? Well, it means volatility, which we like, but also making sure you're resilient to that volatility and not having too much exposure to that specific outcome.

Brad: It also is a good example of the way we approach research, which is using Bayesian logic. So Bayes was this mathematician who came up with what seems very simple, but it's hard to actually internalize and use on an ongoing basis, which is start with a certain credence on something. Say, I have a view that this is a X% probability, 50% probability, and then as you learn new information, say, now I have a view that's 51, now I'm at 48, now I'm 59, now I'm at 52, now I'm at 67, and analyzing all that data that comes in objectively and then objectively going back to your credence and saying, "I'm more confident of this. I'm less confident. Here's where I might be wrong. The range of outcomes has gone from wider to narrow or narrow to wide."

Brad: So we would take a situation like the risk of military conflict in Taiwan and say, "Let's look at every single data point on this that we can. If it looks like a certain branch in the future is taking place that is riskier, let's make those adjustments to the portfolio. Let's make sure we don't have any outsized vulnerabilities that are subject to a fat tail event, a black swan event, in Asia that ... again, the market might treat it as a one in a million. We're probably not going to treat it as a 50% probability, despite all of this conversation about this. Status quo is likely to happen. We're a global world. We're really, frankly, too integrated to have World War III, which is not likely to happen."

Brad: So that's the base case outcome, but you've got to be prepared for that black swan event.

Nate: I'm curious, do you have a spreadsheet that has the Bayesian theorem just for Taiwan somewhere...

Brad: No, it's something we analyze mentally. And it's also the importance of the team working together is to say, "Here's what you were saying about this," whether it's a geopolitical event, something in the economy, or specific company or a sector to keep us honest. 'Well, I think I'm analyzing all this new information objectively,' but then you sit down on the team, someone on the team says, "Well, a year ago you were kind of talking about it this way and now you're talking about it this way. You look a little bit defensive. You said it was these three things and now it's only one of those things and these two new things that you're talking about. So we're not saying you made a mistake in your work, but we think some bias has crept in," and having that trust of a high-functioning team to be able to say, "You're not wrong as a person, but you're wrong about this idea."

Brinton: And it's not that you were lying about these things, it's just that you forgot. You forgot you said that a year ago. We're really good at rewriting history to make ourselves the hero of the story. Humans are great that. Our brains love that. So what happens a lot, we've observed a lot, is people get this overconfidence. They get this high conviction. It entrenches them in their view. And so it's classic cognitive dissonance. Negative information comes in and, of course, they go out and we all go out and we seek enough positive information to offset that negative information, and then we feel good. And that often comes in the form of, "You know, they had a terrible quarter, but I talked to the management team and they told me X, Y, Z and I feel a lot better and I think we're fine." Classic, right? Instead of, "Wow, I thought this, but these data points came along and they changed my probabilities. And now, my new point of view is this," right?

Brinton: So Bezos has this great quote that we've stolen and used for a long time. It said, "You should consider your point of view as temporary." We often forget that and we think that strength comes from having high conviction, having a solid point of view every time. We have a foundation, which is our investing philosophy, and that does not change. But our point of view is incredibly temporary. We're always balancing that against the data points and the changing the probabilities around.

Brad: Yeah. We're saying, "I don't know," all the time. That should be your base case answer to everything is, "I don't know," even if you think you know the answer. If you admit first that you probably don't know, you're going to come close to the truth of that answer. It's just an important part of the way we do it. There's also a chapter in the paper on cognitive bias as some of the common traps that investors fall into, for anyone interested.

Brinton: Yeah. We manage this ratio ... again, this is sort of an ongoing conversation ... but it's between confidence and humility. So when we moved forth with confidence, of course, we have to move forth with confidence, otherwise we don't get anything done. If we keep going step after step, in complete confidence, we often end in arrogance. So we have to course correct. And that course correction is done through humility. But you can't just have humility, otherwise you get beaten down. You never get anything done. So you have to have both. And so, for us, we look at this ratio between confidence and humility as really important. And we start by saying, "I don't know," about stuff that we genuinely don't know because nobody does, and then give our opinion. It's a great step in that direction. It just reminds us all to be grounded and that we're going to bring something important to the table that, really, it's in the team that comes to fruition.

Nate: So I appreciate that. It's refreshing to hear. I just wanted to ask a couple closing questions. So I would love you guys to just take turns. What book would you recommend every tech investor read?

- Brad: I think understanding complex adaptive systems, not to beat this horse completely dead, is probably the most important thing to investing in tech. And so Complexity by Waldrop and Origins of Wealth by Beinhocker. The Beinhocker book is a little dense and heavy on economics, but really important to understand. So Complexity might be a good one to start with. But I think, for us, it's always been what really crystallized our world view as complex adaptive systems.
- Brinton: Yeah. I would totally agree with that. I mean, we do take away from a lot of different books. There's a bibliography on the complexity investing paper, if you want to see a few of them. Since then, we continue to read a lot. One book that I thought was fascinating that's come out in the past several years is Scale by Jeffery West, another SFI, Santa Fe Institute, guy. But understanding complex adaptive systems is just so important, just to beat the dead horse, because it's not just the way the investing works. It's the way everything in life works.
- Brinton: So one of the things we love about our philosophy is, we apply it to this narrow subset of the investing world, but it really applies to everything. So we might use it with parenting, we might use it with friendships, or we might use it with setting up a business. On and on, because it's true in the world as a whole, then we're pretty sure it's also true for investing.
- Nate: What do you think is the biggest trend in your space, in your universe, that nobody's talking about?
- Brad: It's hard to answer because tech is so over-talked about in the media and everything. I do think what we talked about with semiconductors is heavily underappreciated. The things that are talked about in semiconductors are the wrong things. So it think that's definitely one of them. And I think that people are significantly underestimating the pace at which tech is going to disrupt other sectors. And I think people are aware of it and they look at what happened in retail and they look at what happened in the media, but what going to happen in healthcare, and particularly around preventative medicine with connected sensors, restaurants which could get disrupted twice as fast as retail is disrupted with what's happening with delivery and the fact that you may not need a restaurant to get food from, with things like cloud kitchens, which are sort of like virtual kitchens where multiple types of food can be served and handed to an Uber Eats driver.
- Brad: So what's happening everywhere, healthcare and financials, the pace at which it disrupted retail and media is going to be much faster because the pace of disruption is always increasing. And we just think that if you're not investing mostly in tech or mostly innovation, you're just kind of looking in the rearview mirror. And a lot of what's happened with the shift to passive ETFs in the market is, you're buying an index, which is the bigger position of a company in that index is kind of based on how well the company has done over the last five years, because it's done well and it's become bigger in the index. So investing in index is like looking in the rearview mirror while the car is going forward and you just can't be doing that right now, because the pace of disruption is just so high in the economy.
- Brinton: Yeah. I would just say we're not huge trend investors. So we do think about trends, obviously. We may express that in the tail of the portfolio through an optionality perspective, but we recognize that our ability to be wrong on a trend is really high, our probability of being wrong is really high. So we may express that there. But broader than that, a couple of things. One is, this electronics pushing deeper into the world, which seems like a duh type of statement, but probably going to happen. This move to software running everything. The edge that you get from information, and if you don't have this information advantage or you don't have a company that's adaptable to the information age, you're really in trouble. And this accelerated pace of

change. These are all things that we just think about a whole lot that are important for other folks to think about, as well.

Nate: Last question. And you two have sat at one end of the table, facing analysts, pitching stocks many, many times. What's the most important question that an analyst doesn't ask about an investment idea of during their process in ... I guess a better way to ask the question was just, what's the most common mistake you see analysts make?

Brad: The most common mistake is just not saying, "I don't know," enough. You just don't have to have the answers. Often times, a PM will ask the analyst a question and they'll be like, "Oh, I've got to have the answer to this," when the answer should just be, "I don't know, but that's an interesting question and maybe I'll see if I can find out an answer to it. And if I come back and I haven't found it out. Sorry, I just don't know. It doesn't mean it's the wrong question, I just can't figure it out. It's unknowable."

Brinton: And the second most common mistake, I would say, is the short-termism. The perspective is not long enough. We know that our ability to have signal is better when we're talking about broader predictions that tend to be longer dated. It goes down when we're talking about shorter predictions that tend to be very specific. But what analysts, especially new analysts tend to gravitate towards are the shorter, very specific type of predictions.

Nate: Well, guys, I know I could keep doing this, but I want to be respectful of your time. I appreciate all the time that you've given me. So thank you very much for coming on to the program.

Brinton: Yeah.

Brad: Thanks.

Brinton: Let's do it again sometime.

Nate: Yeah. I would love to. It's great to see you guys again. So ...

Brinton: You too.

Nate: Yeah, brings back memories.

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