

**Richard:** 00:01:37 Happy Friday, boys.

**Mike:** 00:01:39 Happy Friday.

**Adam:** 00:0:40 Cheers. Happy Friday.

**Richard:** 00:01:41 Cheers.

**Adam:** 00:01:42 Welcome, Rafa.

**Rafael:** 00:01:44 Yeah.

**Adam:** 00:01:45 Is Rafa okay, Rafa? Let's set some ground rules here.

**Rafael:** 00:01:50 Rafa's perfect. That's more of my Spanish speaking friends. Rafe for more of my gringo friends. Anything in between is perfectly acceptable.

**Mike:** 00:01:59 I like it.

**Adam:** 00:02:00 We probably fall more in the Rafe.

**Rafael:** 00:02:02 Done. If we're staying close to Rafa and Rafe, we're in good shape.

**Mike:** 00:02:10 Very good shape. Yeah, yeah. And welcome everybody to another Friday ReSolve Riffs. And as always, I will warn you that nothing that we talk about is advice. This is education and entertainment and in hopes of garnering and understanding an edge in this world. And if you're looking for advice, probably not four o'clock on YouTube with three gringos, and I guess a Spanish guy. How do you say that?

**Rafael:** 00:02:40 And another gringo.

**Mike:** 00:02:42 Actually no, there's only two gringos.

**Richard:** 00:02:43 I'm not a gringo, man.

**Mike:** 00:02:44 You're not a gringo. Yeah.

- Rafael:** 00:02:46 I certainly am a gringo with roots tracing back directly to Cuba but I'm the freedom child in my family.
- Mike:** 00:02:54 Oh, perfect. Perfect. Anyway, four dudes on a call on a Friday afternoon is not advice. And away, we go, we're off to the races.
- Adam:** 00:03:03 We've just been canceled for sure.
- Richard:** 00:03:05 Totally, I'm sorry.
- Mike:** 00:03:06 It's been great guys.
- Current Events**
- Adam:** 00:03:09 Yeah. Happily. We have zero listeners, we've been taken off YouTube. So, before we get started on with what Rafe's working on, maybe we'll just chat a little bit about what happened this month and maybe more this week. It's neat to see some of the indices recovering. We've got a very nice little snapback rally happening today. When I looked the NASDAQ was up a little over two and a half percent and the Spoons were up about one and a half, 1.7%. So, certainly the rally that some of the more optimistic bulls that I see chattering in social media sphere have been waiting for. And I think maybe a positive surprise given the hawkish orientation of the Fed's announcement and Powell's speech or discussion after the announcement this week.
- Mike:** 00:04:14 It's also interesting like which markets, so copper down 2% today. Dr. Copper a little bit, kind of flattish and not great. Baltic Dry Index down a whole heap in the last couple of months. So, it's interesting cross currents across the markets. And yeah, the Powell commentary was interesting. What did you think of the Druck commentary, the Druckenmiller commentary on sort of the exodus of the Fed from potentially the constant buyer of bonds and maybe having a more pure signaling mechanism coming from the bond market in the future?
- Adam:** 00:04:51 Well, that should be nice to see. I mean, for those of us who grew up with sort of classic macro, a return to some normalcy in terms of the signaling mechanism of yield curve dynamics, for example, and just being able to observe the reaction, the impulse of where rates move on different announcements, whether it's ISM, or inflation announcements or employment announcements, you can evaluate the sort of general trend or tenor of a market by observing the general impulse of the direction of rates and the direction of different equity markets, given the directionality of basic economic and inflation indicators.

And for the last seven-eight years, it's been this sort of bad news is good news environment for equities, right. Where bad news meant that, both in terms of benign inflation, but also in terms of growth that wasn't running too hot, that maybe increase the risk of future inflation, we didn't see any of that. And so it provided room for the Fed to continue to be more accommodative, continued to be dovish, continue to buy bonds, and that was obviously bullish for risk assets, right? So, I wonder, and we've started to see some of this over the last few months, whether we're turning to an environment where bad news is bad news, right? Where negative economic data is negative for stocks. Yeah.

In recent little while, I mean, Microsoft, and well, Apple today, notwithstanding Apple, which obviously has now triggered a strong impulse, many of the tech companies came out with blockbuster earnings. They surprise to the upside, maybe not above the *whisper numbers*, but above the public expectations. And then they ended up either briefly rallying and then selling off or just selling off immediately and dragging the market down with them. So, it does seem to be a different, a market with a different personality at the moment.

**Richard:**

**00:06:59**

But I think at the end of the day, it will really depend on whether the Fed is able to flip that switch from liquidity provider to liquidity taker, right? I mean, will they stop absorbing any new issuances by the Treasury? I'm still skeptical about that, to be honest with you. I think they're still trying to win the inflation issue by speaking to it as opposed to actually having to act on it, and try to re-anchor expectations to more of a hawkish stance. But at the end of the day, allowing the balance sheet to run off, and then raising rates a couple of times, sure.

But in the last 12 to 15 years, that has lasted all of a couple of quarters, and then once again, the economy starts to slow down, and they're forced to be liquidity providers again. So, it feels like in the grand scheme of things, the Fed remains cornered. So, I remain skeptical of their ability to really flip that switch.

**Mike:**

**00:07:56**

It's a hell of a tightrope to walk with the financialization of the economy, right. The stock market used to be an indication of economic strength or weakness. At 200% of GDP, it is becoming the economy. So, how do you walk that line of starting to normalize rates, starting to normalize bond purchases and pull out of that domain whilst maintaining the asset prices? If asset prices collapse -- this much of the economy that has significant sort of negative feedback loops that can be quite detrimental. So, anyway, it'll be interesting to watch.

**Adam:** 00:08:42

Yeah. I still think that there's many people commenting on the expected rate path, maybe missing the other mandate of the Fed, sort of financial stability. In order to promote long term financial stability, you need to reload the shotgun every now and then. Right? And if, like, they used all their bullets, all the bullets are already out of the gun, the horse is out of the barn, like we got to put some horses back in the barns, some bullets back in the gun, whatever, mixed metaphors here. But they need to reload so that if and when we do get a natural cyclical downturn, there is room, there's capacity for them to become more accommodative.

And so they may be, I think they may tighten even while they observe multiple compression in markets, because I don't think they give a shit about multiple compression in the equity market. I think what they care about is, are we seeing a meaningful uptick in credit spreads, which would reflect the bond markets concern that the real economy is under cash flow duress and unable or they are increasing the risk that one of the sectors, one of the household sector or the corporate sector will come under pressure in making interest payments at some level of the capital structure. So, I think they will allow markets to deflate, so long as they don't get a meaningful uptick in credit spreads. And as long as we're not seeing a material impact on the real economy.

**Richard:** 00:10:26

There's another dimension to this, which is the wealth effect, right? I mean, because of this tail wagging the dog effect, because so many people now have assets in the stock market. And whenever there's a meaningful drop in the stock market, that wealth effect supposedly makes people feel, the negative wealth effect makes them feel relatively poorer, and reduces their propensity to consume. And so how that seeps into the real economy to the extent that they stopped spending, or reduce their spending towards the economy. So, that is another interesting component.

But to your point about the bullets and the ammunition the Fed requires, I think we've sort of -- we're shifting towards a paradigm where fiscal policy has now really entered the Overton window and it has now ceased to be taboo to use fiscal policy.

**Adam:** 00:11:20

But I wonder, I mean, we're coming up to midterms, there's pretty good evidence that the Dems are going to lose control. Now we're in gridlock. They couldn't get this infrastructure bill passed, they're trying to pass some things piecemeal. There was a huge -- It's like the zeitgeist was moving through time and it passed fiscal policy and fiscal policy was for a moment in the Overton window. And then it's kind of move past now and fiscal policy is no longer on

the table. And we're looking down the barrel of gridlock in Washington. And I wonder the extent to which they're going to have the power to ...

**Richard:** 00:12:08

Willingness versus ability, right. I think that's the key question. Yeah. I'd be curious to hear what Rafa thinks about all this. He's been quietly watching us ramble on about the market commentary. Rafa, what's your take on all this? And give us a bit of a brief intro if you wouldn't mind.

**Rafael:** 00:12:26

Sure. Well, I think first of all, I think it's interesting where we are historically, right? We've been in a period of generally falling rates since about 1982, right? I mean, Volcker kind of started to put the brakes on things a little bit after Reagan took over and since then, we've been in an environment where rates have been falling. We've had blips, but certainly, it's been an era of falling rates for the last 40 years. So, right off the get go, you have in 1980, dating myself, I was 15 years old. A lot of people that are running the markets weren't even born. So, this notion of inflation, yeah, there we go. The notion of inflation is something that I think very few people have much of a grasp on. It's a foreign concept.

So, the Fed certainly has an unenviable task in terms of trying to thread all these needles, and meet all the demands of their various masters. And like you said, certainly, you would love to see the adults in the room step up with some rational fiscal policy, but I think that the odds of that happening are virtually nil, right? You probably can't even pass a *babies are cute law* at this point in time, where we are politically. So, it'll be an interesting period of time going forward in terms of how the government deals with what's obviously a set of interest rates that are historically off the mark with pressures that are going to move them up.

Whether the Fed does it explicitly or not, we're going to see, as going back to the gringo theme, as a big gringo, I was looking at an article today, the price of chicken wings coming up to the Super Bowl are up about 50%. Now, chicken wings are just one piece of the economy, obviously. It'll be big a couple of weeks. But nonetheless, there's a lot of factors at work that are going to be pushing interest rates if this doesn't indeed turn out to be a transitory rise in prices in the short run. But you've seen Heinz, you've seen food companies, they've been raising their prices, they've announced ongoing price increases.

So, one of the things that I think sets up our firm in terms of what we do is we spend a lot of time measuring corporate performance, and then trying to figure out what companies are worth. And Adam and I have had a number of discussions on Twitter about the pros and cons of doing valuation, and we'll

get into it deeper. But one of the things that we spend a lot of time with is trying to move from nominal or what we call ad hoc rates of return. When you have a company whose income statement is in current dollars, and the balance sheet is in historic dollars, what exactly do you have when you calculate an ROI?

You know, for a number of years, we were sort of like the Maytag repairman. Nobody cared about that message because we'd say it's important to have real rates of return so you can measure companies through time, so you can evaluate what management's doing. In a low inflation world, that's not as important, although, when you have companies whose assets are 30 years old, all that compounding does make a big difference. You know, if you look at a company like Exxon, almost half its balance sheet, if you inflation adjust it, moved up in real dollars. So, our firm has specialized in that, trying to figure out what is the economic profitability of the firm, then how do we take economic profits and link it up to estimating a firm's intrinsic value?

**Mike:**                    **00:15:53**                    Do you think about the sort of turn on inventory or turn on the assets or whatever the underlying business is in the context of the inflationary regime? Does that enter the zeitgeist for you guys? Or is that more of a non-thing?

**Rafael:**                    **00:16:09**                    Right? So, first, absolutely, at a company specific level, we're focused on terms, the efficiency and how much capital is required incrementally to support the business and how much replacement CapEx is required to keep the existing cash flow whole. In terms of at a macro level, the asset turns, our swimming lane really is understanding individual companies. We'll aggregate some data and we can talk about some of the insights that we have to share it kind of a macro level, and we're starting to do some work on duration and trying to get our arms around that whole concept of equity duration. I think we have some interesting things to share in that regard.

But all of our work tends to focus really, on individual companies, are they creating or destroying value? In other words, we want to evaluate management? Are they wealth creators? Are they good stewards? Are they turnarounds? Or are they wealth destroyers? That's kind of the corporate performance piece. And then we move on to what is the firm worth? And is it trading above or below its intrinsic value?

#### Backgrounder

**Adam:**                    **00:17:11**                    So, Rafe, before we get into that, I found when we were chatting, learning a little bit about your background, and how you came into this way of thinking was useful context for me. It's sort of set up, okay, I see why he might have

approached the problem in this way. So, maybe shine a little light on that for us, and that'll set the table?

**Rafael:** 00:17:33

Sure. If we were a country row, we would have a lot of curves in terms of where the road started off in the interstate and where we are now as asset managers. Because our first, our first off ramp, so to speak, was we were management consultants. We built, going back to the basic framework we talked about, about corporate performance measurement and valuation, we worked with Arthur Andersen and helped them build a team of consultants globally to go in and work with CEOs and CFOs and help them understand, what are your actions going to do to your stock price? In other words, are your actions creating or destroying value? And what are the expectations built into your stock price?

And this is all off of a set of models my partner and I created back in '95. We literally were in my basement in Chicago, we kind of, at the time, there were two existing models that had a lot of traction. One was Economic Value Added or EVA. The other was CFROI. We did a lot of work to basically bridge what we thought were the strengths of each into this framework we call an economic margin. You know, back in '95, we were capitalizing R&D and dealing with is R&D an investment or an expense, this whole notion of intellectual capital that really seems to be at the forefront of finance today. We've been doing that for 22 years.

So, we put this framework together, and then we also created a different approach to measuring cost of capital globally. Instead of using betas or a multi factor model. We basically said let each local market tell us what's going on. So, our first project with Andersen was, we were hired by General Motors, Latin America. They were going gangbusters in Brazil, and they didn't know how to set hurdle rates for the Brazilian business versus the US business versus their European versus their Japanese business.

So, you had McKinsey, you had a lot of firms go in and pitch them. And we came in and said, look, I think the existing approach is all wrong. If you want to know what \$1 invested in Brazil should do, you need to look at the Brazilian stock market because that's going to tell you what the risk/return is for investing in that market.

**Richard:** 00:19:51

What year was this, Rafa?

**Rafael:** 00:19:52

This was 1998. So, this was our first project. We had just started working with Andersen in '97, and this project kind of came over the transom. And it actually

was written up in CFO magazine because it was pretty, pretty innovative. But what we did is we then treated each local market as one company. And we adjusted for accounting standards to get everything into this common framework for an economic margin. And we'd go back and each year, we'd project out cash flows, using kind of a trailing look at how well the aggregate companies in that market had done.

And again, remember, we're doing everything on a nominal, real basis. Everything's been inflation adjusted for the asset balance sheets, and liabilities for all these companies; project out the cash flows and solve into an internal rate of return for each market around the world. And then what we were able to say is, look, in Brazil, the implied rate of return for an equity investment, for example, might be 13%. In the US, it's eight and a half. So, you can either go directly to the Brazilian market, or you can basically take every market around the world and standardize it relative to the US and create a multiple.

And that then started to guide their thinking in terms of how we need to start setting hurdle rates with different markets, with different tax rates, and different inflation regimes in each local economy. So, that was the beginning of us as a firm and then we've worked with a number of global 100 companies. Anderson's largest firms globally. We did a project with Daimler Chrysler, where we mapped out 300 business units that would roll up into all of Chrysler. And you could change your capital budgeting assumptions for one unit and see what the implied implication would be for intrinsic value, for instance, for the overall firm. And then obviously, Anderson imploded, and 90% of our revenue base went up in smoke with them. So, we had to figure out what are we going to do next.

So, we thought, well, we seem to do this valuation stuff pretty well. And we have an interesting perspective on how well firms are doing, which is very different than GAAP accounting. So, we created a US equity, independent equity research service in the US, *Applied Finance Group*. And we still have a few, some legacy customers on that which, we no longer sell research. But that business started in 2001 and I think by 2006, there was a survey by Thomson Reuters, and I believe we were maybe the 13th or 14th largest independent research firm in the US. And that was a fun business. It's a little frustrating, because we think we had an interesting way to deal with companies and value them and construct portfolios. And it takes a lot of work to master.

So, a lot of a lot of investment advisors, they pay lip service to valuation, but it's a lot of work. You can't just take a number and use it, you really need to understand it. So, a lot of folks never really internalized it. And then with the

great financial recession, it changed the entire landscape of independent equity research, you had so many advisors get out of the business, it was kind of like Home Depot coming into a small town. Before you'd have a bunch of little hardware stores, local RIA's would take pride in doing research and building portfolios. And then basically all that went away and these guys became aggregators, asset gatherers, and then they'd reallocate to other products.

So, that's when we launched our first model portfolio product in 2012 called the *Evaluation 50*. It's 50 stocks selected from the largest 1,000 in the US. We look to be sector neutral between, kind of using buffers of the S&P value indices to kind of set some sector boundaries. But we're invested in every sector in proportion to those sector boundaries. Very low turnover. The turnover for this product has been about 5%, 10% a year. Since 2012, it's outperformed the value indices, the S&P. I think it's probably in the top two or 3% for that large value core category. So, it's done really well.

And then we started transitioning just into money management starting in 2016. And now we run four publicly traded funds. And we have an SMA practice working with a number of advisors that we used to sell research to. It took us 16 years to get to our first billion in AUM starting with that first model portfolio, to last year. Hopefully, if things go the way they are, we should be at our second billion within a year which is kind of fun. That's the power of how growth tends to work and things play out. So, we've had kind of a really fun journey from management consulting, to research provider to asset manager.

**Richard:**            **00:24:53**            Adam, you're muted.

#### Transitioning From Quantitative Value

**Adam:**            **00:24:55**            Sorry. Yeah. No, that was very helpful. So, I actually think it might be useful just to kind of get the party started a little bit just to build some dramatic suspense. You've had a lot to say about classic quantitative value approaches, right. So, approaches based on sorting portfolios on price to book. So, the classic Fama/French value factor or PE, or price of cash flow or enterprise value to EBITDA, these types of fairly basic valuation metrics, and then just continuing to sort of rebalance and rotate into the equities with the highest value ratings based on one or more of these different metrics.

Your approach is very different. You sort of hinted at why the cost of capital, ROIC, etc. But maybe just take us through your analysis of the state of quantitative value, what's happened, in your opinion, to quantitative value?

Why hasn't it worked over the last 20-25 years? And then we can transition into how you maybe fill the gaps.

**Rafael:** 00:26:13

Sure, sure. So, let's go back to 1992 when Fama/French came out with a Three Factor Model, right. And I think without exaggerating, the world probably owes them a debt for that just for the very reason that they killed beta. I mean, I think beta is an atrocious way to think about risk and cost of capital. And certainly it was an exciting period in the 60's, when the CAPM and beta was starting to gain its traction. And then throughout the 70's, you saw a lot of empirical work. But clearly, by the 80's, this was a tired story that really wasn't holding up to reality as people studied it more.

So, the Fama/French Three Factor Model came out in '92 and I think they did such a great job with the way they sorted and they laid out the data that basically showed look, beta is not capturing risk. So, we can't really rely on beta as a risk metric. And they then set up the framework using size, which has been a well-documented anomaly, and this notion of this value, and the value factor has so many different interpretations based on your own orientation. Is it a behavioral thing? Is that a risk premium thing? There's a lot of ways that that can be interpreted and used.

And interestingly enough, when they published their paper in '92, the data from '63 to '92, if you looked at the value factor, that thing literally printed money. I mean, you mind if I bring up a slide real quick? Is that okay?

**Adam:** 00:27:53

Yeah, please do. Yeah.

**Rafael:** 00:27:56

Let's see. Okay. So, let me just pop ahead to a couple slides here. Okay. So, this chart here on the left, the blue line, basically shows the returns to the value factor from 1963 to 1992. Again, literally, this factor printed money. The chart on that line...

**Adam:** 00:28:28

Is that literally from the Ken French website, or from...

**Rafael:** 00:28:32

It's basically reproduced using the HML process, the *high minus low* sorted on book value and so on. So, the blue line are the, quote, cheap stocks, the red line represents the expensive stocks, and then the black line represents the overall universe. The chart on the right, same methodology, same set of sorts. But now you can see, the value factor really didn't work very well. I mean, it had some alpha when you look at large and small, but for the most part, the entire effect went away out of, I call it out of sample, because I mean,

essentially, they did their study, '63 to '92. From '92 forward, this is how this variable has played out when no one's had a chance to look at it.

When you look at it on the large cap space the end results are even worse. Large cap actually has negative alpha. Small caps from a Book to Price perspective did okay. But large caps basically have had negative alpha since 1992. That's really problematic in the sense of obviously, it doesn't hold up well from a risk theory perspective and it certainly doesn't hold up well from an asset manager perspective.

Now when you think about what a multiple's doing, the classic interpretation of Book to Price is a value stock, which, which I think is, you know, I'm on a joke that I'm on a Don Quixote - like mission to try to change this mindset because Book to Price doesn't represent value, it represents cheapness, right? It's, how cheap am I getting this per unit of accounting metric? Whatever it is, whether it's a composite, its book, its earnings, its sales, what have you, it's cheapness. You know, it's something relative in price, cheapness. Value is some notion of worth. There's no understanding of value in a Book to Price ratio.

In fact, Book to Price conflates many different aspects of what drives value. You'll have, Book to Price ratios just mathematically will differ based on profitability, based on growth, based on risk, based on the likely effects of competition. So, you have all these different factors that are being conflated in Book to Price; which one is driving what? Is it a low duration effect, really? We've had '92 to today has been a relatively bad... again, we talked earlier, it's been a declining interest rate environment. Certainly lower duration instruments will tend to do worse in a declining interest rate environment relative to higher Book to Price. Is that what Book to Price is? Is it basically a sophisticated cyclical play? It's hard to say. There's so many things going into that notion of what is Book to Price, right?

So, intellectually, I think it was a great thing to have annihilated and finally put a stake in the heart of CAPM and the notion of beta. Intellectually, I think it's not a very strong metric to pick stocks from because you don't know exactly what -- it's kind of like Forrest Gump and his box of chocolates. You don't know exactly what you're getting with an individual Book to Price. There's too many things going on.

**Adam:**                    **00:31:49**

So, I mean, I look back at Fama's original study right in '91 and '92. And let me to this day, Fama still is the greatest global evangelist for efficient markets, right, him and sort of Malkiel, maybe. So, that approach, the approach of

adding new risk factors to a pricing model was motivated by a desire to preserve the market efficiency precondition, right. So, I think as you talked about value, I think... So, the idea of... The difference between a factor in the factor of literature context, the academic context and an anomaly, to my understanding, is a factor can be explained by risk, right? It cannot be arbitrated away because investors need to take more risks, or they're taking some type of extra risk in order to generate extra return. Right? An anomaly is something that cannot be explained by risk. Right?

**Rafael:** 00:33:01

Or existing models.

**Adam:** 00:33:04

Yeah, sure. But it's an inefficiency, right? If it is a risk-based thing, we can't quite determine what risk is being priced. Right? So, I think your economic margin approach, it sounds to me like it leans more into the anomaly, you know, end of the continuum, right? You were sort of saying, most investors are wrong, the market is not efficient. And we are able to deconstruct the value accretion process in a way that others can't, and generate alpha through better analysis. Is that a fair characterization?

**Rafael:** 00:33:52

I certainly agree with the second part of what you're saying. I don't, by any means, say markets -- most stocks are wrong. I think, actually, the majority of stocks are probably fairly priced and we'll look at some slides later. But in general, at the extremes, I believe you consistently have mispricing. And I think the move towards passive investing has only exacerbated it. I mean, just mathematically, every time a \$1 goes into an index fund, it's over allocating capital to overvalued stocks and under allocating capital to undervalued stocks.

Now, the question becomes, can somebody sift through that and figure out in a cost effective way, which are the overvalued stocks and which are the undervalued stocks? That by no means is easy, but I think the opportunity certainly lies for that. I think institutionally the runway for firms that are able to do that through time, it's a long runway. I think institutionally, there's a lot of factors that will continue to make passive, get larger and larger. To the extent you're a huge institution, your biggest thing is not shitting the bed, right? You just don't want to lose what you have. You're not as concerned about generating alpha, you don't go to the largest institutions in general and buy an alpha product, you're going there because you know I'm going to get vanilla every time and that's perfectly acceptable, you know.

**Adam:** 00:35:22

Yeah. No one gets fired hiring IBM, no one gets fired hiring Invesco or AQR.

**Rafael:** 00:35:30

Correct.

## Relevant Adjustments to Valuation Analysis

**Richard:** 00:35:31

CYA, right? We're talking about career risk, and that sort of thing. And you're touching on a topic that we've discussed internally, and in other episodes quite a bit, which is this reflexive nature of passive flows and what's been happening with the drive towards index funds and all that. But before we go down that reflexive rabbit hole, I wonder if we might talk a little bit about some of the adjustments that you see that are relevant in some of the valuation analysis that you do?

Adam, you probably remember this, I'm reminded of a paper that the pseudonymous Jesse Livermore did about *the corporate earnings mirage* or something along those lines and how they were overstated to a very large extent. And it had to do, in a meaningful way, I think with the 1970s and '80s and the high inflation of those times, and there were inflation adjustments that needed to be made in order to accurately reflect book value for a huge chunk of the companies that existed back then. I wonder if you might speak to some of the adjustments that you think are relevant?

**Rafael:** 00:36:34

Sure, would love to do that. Let me run you through four slides because I think we can show, we can start with accounting data and end up with economic margin data and see, you guys tell me what you guys think of the adjustments, and we can just kind of critique them and have fun in real-time.

Okay, let's start here. This is the FTSE World Index. It looks at, this is a one year slice in time looking at earnings per share growth against PE. And it sort of frames the whole discussion of what corporate performance measurement is. In our view, in our humble beginnings in Chicago, what we wanted to do was create an approach that said, hey, if we go to a company, and we talk to management, we want to give them a metric that says if you're doing well, your stock price is going to go north.

So, corporate performance measurement, kind of the first level of, the first ante, if you will, in the game is that you need to have a metric that says if you're doing better or worse, the market is somewhat recognizing that in terms of valuing your assets. So, when you look at earnings per share growth or earnings growth, net income growth against PE's, in theory, more net income is good, so you should be trading at a higher PE. Right? If earnings truly had a lot of information content by itself, the faster I'm growing my earnings, the more I should be willing to pay per dollar of earnings because it's more valuable. There's too much noise there, there's not much relation at all between them. And just kind of a couple factors going from a bigger picture perspective of the adjustment, earnings does a horrible job with cost of capital.

It assumes the cost of equity is free. It doesn't handle inflation well, doesn't deal with cash flow. You know, there's a number of accounting issues that distort earnings.

When Exxon builds a new rig, it gets to put it on the book and match it to the earnings it generates over time. When Alphabet invests in a new algorithm, it has to immediately expense it because it's R&D, right? So, also by point of reference in '95 there's different studies that show that tended to be the inflection year when intellectual capital started to surpass physical capital expenditure in corporate America. So, this is something we were aware of that had kind of been percolating for a while. So, we wanted to explicitly address this. So, ...

- Adam:**           **00:38:56**           Just to press pause on that, because I feel like you've circled this a few times, so I want to make sure we explore it thoroughly. So, am I right that primarily the adjustment you make due to the example that you described where Alphabet's algorithm gets expensed in that year, whereas a rig from ExxonMobil gets capitalized and accrues over many years? **Are you primarily capitalizing R&D?** Is that a fair kind of ...
- Rafael:**           **00:39:33**           Yeah, absolutely. That's a key adjustment we've made forever since '95, yeah. So, this...
- Adam:**           **00:39:42**           To what extent does just capitalizing R&D? Like if you capitalize R&D and then use PE or Price to Book as a simple sort. Do you have any sense of how -- what kind of impact that would give you or like to what extent that would close the gap between those sort of simple cheapness metrics and your value concept?
- Rafael:**           **00:40:10**           Great point. So, let's look at this. This is Amazon. And I believe this is Amazon in 2017. Okay. Net income for Amazon was 3 billion, R&D that year was 12 billion. Big difference, right? You're talking about a factor of four at that point, other adjustments that we go through, we're adding back depreciation that was 11 and a half billion, operating leases, which essentially is debt that they're able to keep off the books through a number of accounting conventions, 2 billion. A couple other adjustments, a couple 100 million. All of a sudden, you go from 3 billion of net income to almost 30 billion of what we call operations base cash flow. **For a company like Amazon, you're off by a factor of 10 when you're just focusing on the earnings number.**

Going back to answer your question, Adam, what's the effect? It depends on the company. It really does. You know, you can look at things in aggregate. And I think what's interesting is there was a study put out by Campbell Harvey and

Rob Arno, where they went back and they capitalized R&D for firms and just added it straight back to book value, and then re-ran all the price to book metrics. The bottom line is it improved them, but the Price to Book significantly still underperformed. And we actually ...

**Adam:** 00:41:33 So, that's not a magic bullet.

**Rafael:** 00:41:36 Certainly, it doesn't fix it. It probably, I would say and I agree with the adjustment. My comment on that, though, is adding back R&D or intangible type expenditures for a firm like IBM has a very different economic impact than if you're capitalizing and letting the value effects flow through for a firm like Alphabet. Right? The return on investment to R&D has been very different over the last 10 years for Alphabet versus IBM. And treating it that you're just adding everything back to book value and everybody gets the same multiple of those intangible expenditures, I think is not a very robust way of doing it. I think, to handle ...

**Adam:** 00:42:20 Who's to say that the return on R&D investment between IBM and Alphabet is not going to mean revert over time?

**Rafael:** 00:42:30 It may, it may. But that's something that today, if I were to bet on the incremental return to an R&D investment for Alphabet versus IBM, and I look at Alphabet's history of what I call, what we call economic margin, and I'll show you how we get there, I would say I'm much more willing to pay for Alphabet's incremental return on that R&D than I am for IBM. I wouldn't treat them the same. It doesn't mean they won't mean revert, but there are other ways of handling that as well in the sense of and we can get at that because the way we think about valuation is very different than saying, okay, we're going to take a \$1 of cash flow and capitalize it at 10% so it's worth \$10, right? That notion of capitalizing and using kind of a Gordon Growth Perpetuity Approach gets to your exact point, and that is competition never affects returns.

I think a much more insightful way is to say, look, certainly today, my best guess is Alphabet is doing much better than IBM. But I believe at some point in the future, the economic return to Alphabet is probably going to start approaching average. And in an economic sense, average is my ROI is equal to my cost of capital. And so the question then becomes, this is not a perpetuity it's a question of saying, okay, can I have a reasonable approach to say, how long am I willing to pay for Alphabet to have these excess rates of return; what we call *an economic profit horizon*?

**Adam:** 00:43:59 Right, so economic profit is ROIC minus COC?

- Rafael:** 00:44:06 Correct. For most firms, that's zero, by the way. For most firms, it's zero.
- Adam:** 00:44:11 Or negative, I guess.
- Rafael:** 00:44:13 Well, for most, it's zero. But yeah, you have a distribution for sure. So, you have a lot of negative economic margin firms also. Absolutely.
- Adam:** 00:44:21 So, this is actually an area that I really wanted to pull the thread on, because I think a lot of the discussion we've had online, etc., has revolved around your calculation of cost of capital. But I'll tell you what, I'm happy to put a pin in that if you had an arc of ...
- Rafael:** 00:44:40 Let me go through one more slide for adjustments just to kind of complete the loop on that. So, this is now Apple versus Exxon balance sheet. Again, 2017. You look at the asset base for these firms, approximately similar. Apple has about 375 billion of assets, Exxon a little back for my screen call it 350 billion.
- Now, what does it take for each of these firms to generate a \$1 of revenue? Exxon has a ton of assets that are depreciated, but not retired, they're still generating cash flow for them. They're just partially depreciated. Also, we get back to this inflation adjustment we talked about. Exxon has assets on the books that are still generating cash from the 70s; the refineries, they might have drilling equipment that has super long lives. You know, you put these assets on the books on the 70s, you're generating dollars in 2020, your ROI is going to be really inflated, right?
- So, what does that mean? If we kind of work through the adjustments in this case, we move Apple from a nominal balance sheet, net balance sheet of 375 to three, what is that, 395? Exxon, we take from 350 to 684 billion. So, the inflation adjustment that I mentioned earlier is almost 50% of Exxon's balance sheet, partially depreciated, but not retired fixed plant is two thirds of its balance sheet. An accounting based ROI for these two firms, I have no idea what you're getting. What's the ROIC on a nominal balance sheet like Exxon's? I don't know.
- Adam:** 00:46:23 So, why don't we apply the same logic?
- Rafael:** 00:46:26 What I do know, every company that I look at, I know I'm calculating the absolute wrong number. I just think I'm calculating a better number than everyone else.

- Adam:** 00:46:35 Yeah, no, I like that.
- Mike:** 00:46:37 The one-eyed man.
- Rafael:** 00:46:39 That's right. It's the camper joke, right? The two guys camping and they see the bear and one guy's putting on his shoe and the guy says to him, "You can't outrun the bear." And he's like, "I don't need to outrun the bear. I just need to outrun you."
- Adam:** 00:46:50 Mm-hmm. I'm just wondering, in this calculation, like if you were to capitalize R&D for Apple, that R&D becomes an asset. Do you then add back...
- Rafael:** 00:47:04 We do, we do. Yeah.
- Adam:** 00:47:05 Okay, okay. So, then if you add back all of the accumulated R&D and or you -- I don't know, R&D is this weird thing, do you depreciate the R&D then the same way you do other assets?
- Rafael:** 00:47:17 We do depreciate it, yeah. We assume over time that has to be replaced to keep a current level of cash flow, just like any other asset. You have to continually reinvest in that R&D. And that, for us, the way that we approach it actually came from our work in management consulting. We dealt with a lot of industrial firms, we dealt with healthcare companies. We dealt with conglomerates, like Daimler that had both technology and industrial firms. And it was fun. We were able to talk to a lot of these executives to get their perspective on how does R&D work for them? And you know, it was pretty clear, R&D for an industrial firm has different properties than R&D for a tech or healthcare type company. And so, going back to what we've done, just going back to the '90s, late '90s, we've incorporated those insights that we gained from management consulting in terms of how we treat R&D for each different type of firm that we have in our database globally.
- Every Company is Different
- Mike:** 00:48:13 So, there is a real idiosyncratic sort of special sauce to the way you interpret each company.
- Rafael:** 00:48:19 There is a, I'd say idiosyncratic in the sense of we've standardized a lot of... my partner and I are basically fundamental analysts that grew up in the sense of a system sense of how do we apply a lot of individual fundamental analysis on a mass scale. And so we literally have, again, this is back in the mid-90s, we literally had pages of thoughts on how different adjusts...

- Mike:** 00:48:49 So, better word would be bespoke or tailored.
- Rafael:** 00:48:53 Yeah, right. Certainly. That's why we're research nerds as opposed to like... we could certainly have some help on -- I could certainly have a lot of help marketing our services because I'm very much a research nerd. It's too easy for me to like, talk about this stuff for hours. So, we literally have pages of adjustments that we make systematically. We don't touch this. And that's -- my last quarterly letter, one of the things we talked about was, is DCF subjective. And that's another conversation you and I have had Adam, it can be, but it doesn't have to be. It's subjective, because of the way the process has been historically set up by most. We have a very ...
- Adam:** 00:49:32 It's subjective anyway because you can say that it's objective because you use historical parameters in order to forecast using a model, right? But you still need to construct the model, right? You can construct the model empirically based on some look back horizon about what's worked empirically over time, which has problems. Or you can do it using some sort of first principles understanding about the economics of businesses and how those businesses are rewarded in markets with higher multiples. Either way, you're systematizing, based on a model, right, which in the end is, you know, either ...
- Rafael:** 00:50:19 Correct. We had to load in parameters for this model before we set it loose. So, I completely agree with you. In '97, when we kind of finalized the work we were doing, we had to make a number of subjective calls. Since then, the model has run, what I'm going to say is objectively, using that subjective set of parameters we loaded up 25 years ago, but one of the things I think that is set us apart from anyone else, is everything that we work with our data is all live out of sample, because absolutely, we loaded up the parameters for our data from the period of 1995 to 1975, that's what we studied to help us understand how long should we pay? What should be the economic profit horizon for a company with attribute X, Y, Z versus a company with A, B, C?
- Adam:** 00:51:14 What would X, Y, Z versus A, B, C be there? Because I feel like that's a huge piece to the puzzle, right? The fact that you have different ... convergent, rates of convergence, mean reversion, I guess. What are some factors that go into that?
- Rafael:** 00:51:31 Sure. Let me just talk to this slide and then I'll take you to that slide.
- Adam:** 00:51:36 Sure. Sorry, I keep jumping around on you.

**Rafael:** 00:51:37

No, this is great. I'm having a ball, so I'm sure you guys will pull the plug on me before I run out of enthusiasm for the topic. So, go through all the adjustments and there's some other things about calculating something we call a *capital charge*. We don't have to get that deep in the weeds, happy to, but we don't have to. Same set of firms if you change the optics and look at it in terms of this, what we call an economic margin, which is this adjusted ROIC minus the cost of capital.

And you look at a Tobin's Q, market value of equity and debt relative to the capital invested, what we see is the higher the economic margin on the capital you've invested, the more the market's willing to pay per unit of capital. Pretty stark contrast between where we started with earnings and where we ended up having cleaned up the accounting data globally. Okay.

**Adam:** 00:52:25

Yeah, and that's an absurdly tight correlation.

**Rafael:** 00:52:30

Yeah, I think every year ... some years are better than others. But yeah. I don't know... we never put the R squared just because that's not as important to us as the fact that we just move from generally a circular blob to some sort of linear, something that makes sense, you know. We're not focused on the number, we're just focused on the concept. We just believe it's a significant move forward to understanding how well firms are doing when you kind of walk through these set of adjustments.

So, now, this is the first piece, how well is the firm doing, that then leads into the second piece of the discussion, what is the firm worth. And let's just kind of take a quick look at this economic profit horizon. This is one application, we could go back to that possibly, but this is kind of the core concept of an economic profit horizon. You start off with the level of economic margin. And then the question is, are you willing to pay for 10 years, or you're going to pay for 30 years?

And sort of the key factors that drive this are what's the variability of a firm's historic economic margin? The more variable it is, the less I'm willing to pay for it. Think of a, it's kind of a classic cyclical argument, if you're in a cyclical company, at the peak of the cycle or the trough, you're going to quickly mean revert it, versus a company like in the '90s, you go and look back at the consumer products companies that had ROIs that were smooth as glass, right, you're willing to pay a lot longer for those firms than you were for a GM for instance. That's one attribute.

Another attribute is firm size. Small firms can improve their business much faster than a large firm. However, a small firm's economic profitability can be subsumed by large firms much faster than the economic profitability of a large firm. It's much harder to change the direction of an aircraft carrier than a speedboat. It's that core concept and we found that to be a very significant variable.

And lastly, it's sort of a momentum in your performance. If you're defying gravity, we're willing to pay a little bit longer than if gravity is already pulling you down; we're going to basically shorten the amount of time that will pay for you. Very subjective in terms of the factors that we chose. You know, the fun thing for us is we didn't pick any of these things from the perspective of publishing back in '95. We just needed to pick what we thought was the best model so that we could find a partner to help us sell to corporations.

So, certainly it was very subjective, but it doesn't have -- didn't have a number of pressures that maybe some academics have with respect to having their work published -- that was never an interest of ours and never a goal to publish any of our work. We just wanted to come up with what we thought was the best approach to doing this. We had no idea we'd be in business in 2022. You know, that's 27 years later or however, many years later it is, God knows. It's been a while, and it's been a great ride. But we kind of loaded up those subjective factors, and we've let it run since. We've never changed it.

#### Valuation Variables

**Richard:** 00:55:38

Rafa, I'm reminded, in my previous life in Brazil, for several years, I was an equity analyst. And once you start modeling, you really start to understand how sensitive the expected price target you might arrive for a company is to a couple of the major variables, you've touched on one, which is the cost of capital. And the other one is the growth expectation. Right? And so when we're talking about subjectivity that is one that I find really hard to accept as a premise because how do you define, what is the range of growth expectations that you find reasonable for any given company? How do you arrive at those and how not to think of those as subjective variables at the end of the day?

**Rafael:** 00:56:25

Great point. And I think this slide speaks directly to your concern. This is actually a stock that we owned, back in 2015, Micron. And I believe we bought it at maybe 14. And then as luck would have it, as soon as we bought it, it dropped to 10, or nine. And one of our clients was asking us what the hell are you guys doing, why are you holding this stock? And they did their own valuation analysis on Micron. And they sent us this little table. And the table said, look, we think, with some reasonable circumstances, it could be worth 24.

But if we change the cost of capital a couple hundred basis points, we change the growth rate a couple hundred basis points, it's only worth 12. And then if we change it the other way, it's worth 60.

So, we don't think anyone can have any idea what the stock is worth, right? And we said, if we had parameters like that, we would agree with you. If your estimate of intrinsic value is more volatile than the traded price, you have no idea about an estimate of intrinsic value. And I think this is a very common issue with most valuation approaches. Going back to that whole notion of perpetuity, if you decide the value of a company is \$1 divided by point one, you're saying everything that goes into estimating that dollar never changes. And then you're saying, I'm going to capitalize that forever, and we know forever tends to be kind of a long time. And a lot of things happen between now and forever. Right?

So, our approach is a little different. You know, that's why we created this economic profit horizon. What we're explicitly saying is that, wherever you're starting, the one bet we're making is that you're going to end up with zero economic profit. And for the vast majority of firms in general, that tends to be a pretty good bet. There are some firms that consistently beat that, that's why they're a great company. Right? That's what makes them such a spectacular, admired firm.

**Adam:** 00:58:29

So, okay. No, go ahead, Richard. Sorry.

**Richard:** 00:58:34

Oh, yeah, I'll just conclude the sensitivity analysis that you showed is something that we used to do back in my equity analyst days. And it's exactly to your point, I mean, you have to understand how sensitive your valuation is to those core assumptions. And at the end of the day, the exercise of creating a model for the company is more about understanding how the company works, and how the cash flows and how the balance sheet and all those interactions work as opposed to actually defining a particular price to that, right. Because at the end of the day, our ability to forecast is very low as it is, and so thinking that we're going to be able to accurately forecast 5-10 years in the future is nonsense, understanding the sensibility of those, the sensitivity of those variables to those assumptions, I think is the key.

**Rafael:** 00:59:27

Right. So, just a quick sidebar on your point, When you forecast out five years and then you do the -- you kind of capitalize it with a Gordon growth model, the back end capitalization is oftentimes 50, 60, 70, 80% of the answer. And arguably, that's the part you know least stood out, right?

**Adam:** 00:59:48

So, to that point then Rafe, when a company's ROIC converges to its cost of capital, at that point is the assumed value of the company equal to the accumulated assets? Like, you're now in a liquidation value for that company?

**Rafael:** 01:00:05

Okay. That's a very subtle but great point. So, what happens is, once you assume once you get to the point that the ROI is equal to the cost of capital, present value of future growth is zero. Right? So, you don't have a perpetuity issue with the value of the firm. Once you get to ROI is equal to the cost of capital, they can grow, they want, they're not going to add any net present value back to the firm. So, the valuation problem getting back to, this is where I think valuation is very subjective. And a lot of people have problems with the subjectivity.

Now I grant you, we made a lot of subjective assumptions back in '95, and '96, and '97, but we let them run now. So, when you get into, I'm going to take this company, and I'm going to grow it sales 7.8%, next year and 9.6%, the year after, and then I'm going to fiddle around with the terminal value assumption. That to me, is what people think of with subjectivity and valuation, traditionally. I think that tends to be the biggest criticism.

Now, we do this with the economic margin, we also do this with the implied growth rate, the growth rate that we use and the growth rate that we use, we take from what the company's telling us in terms of its capital structure, and its dividend and share buyback and debt buyback policy. So, we kind of let the company tell us what it's doing with its cash, is it returning it or is it reinvesting it?

The end result, let me just show you Micron from a different perspective, if we can pop this back up, and then we can kind of take this into any direction we want. This is the way we look at the world and we've done this since 1998 every week, and we do it for 20,000 stocks around the world. We take one point estimate of where the economic profitability is today, we have one point estimate for what that economic profit horizon is, we have one point estimate for where we believe their capital growth is going to go and we combine it with our current estimate of a company specific cost of capital and we can certainly dive in as much as we want.

But kind of the interesting thing here is, as we were transitioning from management consultants to equity analysts, we had that little thing called the tech bubble back in 2000-2001. And so we would approach people and say, Cisco is trading at 85, it's really worth 14. You can imagine, I think we literally got a death threat in our office once. We sent out a report to anyone, any

email address in the research, in the money management industry we could find. One person literally wrote us back saying you guys should just be dead. You're so stupid. I mean, whatever. That's our estimate. That's what we believe.

**Adam:** 01:02:44 That's when you know, you're right, mate.

**Rafael:** 01:02:46 Maybe.

**Mike:** 00:02:47 Well, you might have been wrong, well, wrong-right, whatever. But \$15 to 85. That's where the visual was coming from.

**Rafael:** 01:02:57 Correct. Absolutely. No, no doubt about it. This is Micron, you see the same pattern, right? It was trading up around 60, we thought it was worth about 10. And so the blue bars represents the annual trading range for the year, the little horizontal slashes where it closed. That solid line, and again, we do this weekly, but this is just kind of an annual point estimate, is what we think the stock is worth at any point in time. So, for Micron, no one wanted to talk to us, people thought we were nuts. It took until about 2006-2005 for Micron's traded price to converge to its intrinsic value. More or less, it stayed there until 2015 when we bought it at like 16 and it immediately dropped to nine.

But for us, one of the things that we think is interesting is we've scored our intrinsic value model live for 20,000 stocks globally every week. So, when we see a situation like this in 2016, where the stock price continued to drop, and the intrinsic value is not moving, we had a lot of confidence in what we're doing. I mean, we've seen these shows over and over again. And once we had an analyst kind of confirm this company is not going out of business, there's just a lot of bad sentiment, it's like okay, that's fine. We have some of our products are purely quantitative. That Valuation 50 product is a quantitative/qualitative, it has a -- that uses our intrinsic value as the main sorting mechanism. And then analysts work with our model to generate their own estimates of intrinsic value incorporating information we don't have.

So, again, our view of value is very different. We believe value is an absolute concept and, and it should be treated as such as opposed to kind of this conflating so many different factors into a cheapness concept. Perfectly fine for people to invest with cheapness and a lot of brilliant people do it. We just don't think that's the right way to do it. And we certainly don't think that should be what's called value investing by any stretch of the imagination.

End miniriff here

- Mike:** **01:05:02** So, it's the classic, what is it, the Buffett quote where you've got the market as being in a long term, what is it a weighing machine ...
- Adam:** **01:05:16** Yeah, that's Graham, right?
- Rafael:** **01:05:19** Yeah, the weighing machine, voting machine, right.
- Adam:** **01:05:22** Yeah, voting machine in the short term and in the long term, it's a weighing machine. Yeah.
- Rafael:** **01:05:26** I think what's interesting too, is a lot of folks believe valuation or value, buying based on intrinsic value requires a catalyst in order to realize it. And we would say that's not the case at all. Human behavior is the catalyst that's constantly over and under shooting. In the context of an asset pricing model, what we found is, regardless of how you want to handicap intrinsic value, whether it's a CAPM, a Fama/French three, a Fama/French five, you incorporate momentum into it, which is what AQR did. **Regardless of how you're handicapping the results of valuation, the alpha's always significant.**

Interestingly, when you take, let me just pop back to a slide earlier, just to kind of run that really quickly, just to show you some idea of magnitude of that. Maybe it was the other way, I was probably right near it the other way, apologies. When you look at it, from the perspective of how do other factors look, from the perspective of do they generate alpha in the presence of valuation? The answer's kind of interesting. So, this is the alpha to basically the intrinsic value factor, which is our estimate of intrinsic value divided by the stock share price, ranked.

So, to the extent that that ratio is high, the stock is undervalued, if it's less than one the stock is, is overvalued, and you form an intrinsic value factor with kind of the 30-40-30 sorting of portfolios. And what you see is regardless of which model, not only is the alpha there, but statistically, the P values and the T stats to this alpha, super strong. Now, you take the same concepts of what are traditional asset pricing variables. And we did this during COVID, because we couldn't talk to anybody. So, we thought, okay, let's figure out how we have our coming out party. So, we constructed an Applied Finance asset pricing model that has intrinsic value, corporate performance. And instead of Book to Price, to us Book to Price is sort of a noisy proxy for leverage.

So, we put leverage in directly and then obviously, we had size also. And when you do that, all of the factors that tend to get attention from an asset pricing perspective, they're all insignificant. Some of them, you know, momentum

generates alpha, but the T stat on it's only about 1.2. So, it's a very noisy estimate of alpha, after you've accounted for what's the company's performance, and is the company over or undervalued, and then what's it's leverage. There's just not a lot of meat left on that bone.

**Adam:**           **01:08:11**           The alpha from the momentum factor probably ...

**Rafael:**           **01:08:15**           The momentum factor for all of these factors. You know, the profitability factor goes away, the investment factor goes away. The low volatility factor goes away. Beta goes away.

### Central Philosophies

**Richard:**           **01:08:25**           You're touching on a couple of points that I wanted to kind of use towards maybe pivoting the conversation from valuation towards an asset management and particularly towards what you guys now do as your core focus. And we've seen, especially throughout the last 12 years, how valuations or cheap valuations are definitely not enough to trigger the re-rating of a stock, and that there are other factors that have been confounding price dynamics in the equity market to a large extent.

So, I wonder if you might talk a little bit about how you incorporate whether it's macro, this top down approach for looking at triggers or how it is that you bring on some trading considerations to this bottom up valuation approach in order to not be confounded by some of these non-economic players and the ETF and the passive drivers that we have. Yeah.

**Rafael:**           **01:09:33**           Right, right. Sure. Well, let me start off with our central philosophy is, there's two things that we don't want in a stock. We don't want to own overvalued stocks, and we don't want to own wealth destroying stocks. In other words, what we don't want is we don't want to own and again, this is philosophical.

So, we started with Fama/French in 92, then in 2015, they added profitability and investment as factors to their model, right? Philosophically, we have a big problem with what they did with the investment factor. Basically, the loading on the investment factor is negative, which says companies that are investing are going to generate negative future returns. And that derived analytically from a model of the firm where the price of the firm is equal to, in clean surplus accounting, net income minus investment, right. So, kind of dividends minus investment.

And in that context, the logic is take derivatives with regard to profit, take derivatives with regard to investment, holding all else equal, more investment leads to lower returns. Okay. Analytically, what I think is really missing in that entire concept of the firm is the fact that you're not investing to not get future returns on that investment. So, there's an interaction. Whenever a company makes a new investment, there's an interaction between that investment and the ROI. And that's completely missing in the analytic structure of what drove the investment factor.

And what I think is amazing, and this blows my mind when you think about literally, every significant quantitative value firm uses the investment factor. And what that says is, I cannot buy -- I'm going to be biased against firms that are compounding well. If you're investing above your ROI, because you're investing, it's going to be a negative tension, your profitability may be a positive tension, but I don't know how it's going to sign. And that's completely wrong. You want to buy firms that are compounding your wealth by investing in ROI greater than the cost of capital, I mean, that's just basically NPV finance.

**Adam:**               **01:11:40**

So, is it as simple as or not as simple as, but if for example, Fama and French had decided that instead of adding investment and profitability as independent terms in the regression, if they had added investment or profitability as an interaction term, where firms that are highly profitable and have high investment may have rated -- that they might have a positive beta, right? But obviously, high investment and low profitability would be unattractive, right? Is that a simplification, a reasonable approximation of the direction you're going there?

**Rafael:**           **01:12:21**

That's not a simplification. I mean, I'm a simple farm boy from a small town of California. That is exactly where we're going. Let me show you another slide on that quickly, because your intuition is exactly right. So, let me just pop through, and I'll show you what we call a *wealth creation matrix*. And it stems directly back from the concept of an economic margin, and what we learned from working with managements. This is exactly it. Here on the bottom, you have economic margin, negative or positive, and on the Y axis, you have investment growth.

And here's the thing, investment growth is bad when you're earning less than your cost of capital, when you're a destroyer. If you're growing negative spread businesses, that's bad. If you grow a positive spread business, getting back to your term, because there is an interaction, it's not a static. Take a derivative with respect to investment and it's negative. that interaction leads these sets

of firms to be among the highest returners. The entire industry has missed that concept.

- Adam:** **01:13:31** Yeah, I mean it's -- As you say it, I'm like, of course, that's true. That's like extremely obvious. Like, I don't know how I've read that paper, and have ruminated on it, written on it, explored it, argued around it, whatever, all these years, and this unbelievably obvious piece didn't fall out.
- Rafael:** **01:13:52** You're not the only one, right? Rattle off any large quantitative value firm, and they've all incorporated the investment factor into their work. And I think I'm sure they'll all go back and there'll be a lot of revisionist history at some point as kind of our work becomes more popular and it becomes more widespread and accepted. But every firm out there in the quantitative value space has incorporated this concept of *growth is bad*. And they can justify it however they want, but it really is a fundamental misunderstanding of wealth creation, and what NPV and what valuation is about. And it's an empirically driven coefficient that worked really well over a given time period, that to me represents the worst and it's just not good. To me, it's not a good development for finance that has become accepted to just keep adding on factors that try to explain asset pricing. To me, that's ...
- Adam:** **01:14:49** You know, again, here you have a, maybe to wax prosaically a little bit, you've got a canon that began with, you know, maybe the seminal Fama/French paper wasn't the beginning, maybe it was earlier kind of Sharpe papers or Trainor or you go back far enough, I'm sure there's a canon that starts earlier than Fama/French. But they began this, they created a method for testing pricing models and every pricing model, from that point forward, needed to conform to their methodology or else, it couldn't be understood in the context of the methodology that everybody learned, right? And so they kept...
- But what that implied, a bunch of different assumptions. There's the sorting mechanism, there's a difference between deciles and tertials, or quintiles like quintile sorts. Are you equal weighting, are you cap weighting? The way that they created the value factor was like one half of the returns of the factor were for large cap sorts. The other half were from what were essentially nanocap sorts. So, you can't economically capture the factor that they had created.
- Rafael:** **01:16:10** Right, right. Sure. They had the market cap weighted, small cap bucket, the market cap weighted large cap bucket. And then by the way, we're just going to average the two buckets.

- Adam:** 01:16:17 Exactly. Right? Which is ... But they created this methodology, and then every researcher then on if you wanted to get published, needed to at least create an analysis in the spirit of that, or you don't get published. You might off road a little bit, but nobody knew how to interpret you're off-roading. Right? So, you've got this situation where you add these factors as linear betas without accounting for interaction effects....
- Richard:** 01:16:51 Did we lose Adam?
- Mike:** 01:16:53 Yeah, this has been happening a bit.
- Richard:** 01:16:56 I think we lost everybody at one point.
- Rafael:** 01:16:58 Yeah. Right.
- Richard:** 01:16:59 It seemed like he was going for a really interesting point.
- Adam:** 01:17:01 I'll have to go back a few seconds, I don't know.
- Rafael:** 01:17:02 We lost you just as you were about to hit the interactive and then you froze. But it was a great pose, because there was a lot of passion on your face right there.
- Mike:** 01:17:12 The interaction effect. Go.
- Richard:** 01:17:15 I think he can't hear us.
- Adam:** 01:17:16 Wow. Sorry. No, I -- Yeah, I know, you guys went dead for a minute. Anyways, I'll wrap this up. I'll try to, anyways. The point being that, maybe because they were constrained to their experimental setup, that's why this seemed to work. For example, maybe because they're using cap weighted portfolios, and the majority of companies have negative or zero economic margin, this framework worked. Like just because of the way that they sort and they assemble portfolios, maybe that's why the betas seem to load in the direction that they did, right? If the design had been slightly different, and maybe more thoughtful, then they wouldn't have found that the betas loaded the way that they would, and they would have rejected that whole framework. Right?
- Rafael:** 01:18:11 Would have been. Certainly, the investment factor is a super strong factor. I mean, it really is. It's a very powerful variable that indeed you're investing, the

first pull of that is to drive down your returns, because you're spending the cash. So, I mean, they certainly, that at level one analysis, it was right. The thing is finance people like to make fun of the accountants in academia.

But you know, the accountants have a lot of information about company specific analysis that bears on the problem. It's just that for the last 50 years in finance, fundamental analysis has been shunned. And what great finance departments around the world still have fundamental analysis? Most of them are being taught in the accounting department. There's a lot of value for these guys to talk much more to each other. And everything's not just a backward looking statistical property. You need to understand the real economic drivers to make company specific analyses to make the data make sense.

### The Cost of Capital

**Adam:** 01:19:13

That's neat. Okay. We're almost at, we're at an hour, 20 minutes here, and the thing that I most wanted to talk about in this conversation was cost of capital. So, walk us through because to me this, obviously, we all study beta to derive cost of capital, weighted average cost of capital in our CFA programs or our finance programs. You obviously reject that, I reject it too, empirically. I mean, it just does not have any calibration whatsoever with forward required returns. So, there's no... it just doesn't make any sense empirically. But I do wonder how you approach the computation, the imputation of cost of capital? So, maybe speak to that.

**Rafael:** 01:19:56

Right. Sure. You won't believe this but I actually don't have a slide for that. The one topic I don't have a slide to talk about, but I'll just kind of talk through it verbally. So, we start off with kind of the core premise that at a macro level, there's some base real rate of return that investors require that I don't know what it is. But from that base rate, it sort of moves up and down based on taxes and inflation expectations. So, what investors ultimately care about is a real rate of return. So, there's ...

**Adam:** 01:20:34

That infamous R-star that the central banks have been wondering what it is for decades now.

**Rafael:** 01:20:40

Sure. We'll just call it R-star. And then that kind of moves up and down based on not as much taxes now, because now you have so much institutional dominance in the marketplace. But certainly, we saw this much more when we looked at data in the '70s and '80s, that as tax rates were moving, capital gains rates were moving, that affected cost of capital, but let's just call both of those effects at the macro level. And then at a company specific level, we think going

back to one of your earlier points, what should we be? What should we accept a higher reward for? Things we cannot diversify away.

So, at a company specific level, the two things that we, as a firm, latched on to that made sense to us, as we were working through our logic for this was size and leverage. If I have a portfolio of small firms, and there's a bad shock to the economy, all the small firms are going to get creamed. If I have a portfolio of highly levered firms, and there's a liquidity crisis, almost doesn't matter what industry they're in, they're all going to get creamed. These are hard things to diversify away in terms of big risks that can happen to a portfolio if you're just concentrated in those two spots. So, that was the logic that we had.

And then we said, okay, how do we get there? How do we get to an answer? And then how do we implement it? And this is what we ultimately did. We did it ourselves first and then this is what we sold to General Motors for this larger cost of capital study, globally. We wanted to treat every firm in the publicly traded market and aggregate them, do a massive pooling of accounting interest, where we add up all their income statements and balance sheets, and we calculate an economic margin as if they were all one firm. And then we know the market value of their equity, we have their debt, we capitalize their leases. So, we kind of know the obligations are the total enterprise value of the firm.

We're going to treat this as a singular firm, and forecast out economic margins that are going to converge to zero over time. And we're going to forecast out capital reinvestment rates the same way we would for one firm. Generate that stream of cash flows and then solve for the IRR that equates those cash flows to the current market value of debt and equity, and sort of get an imputed economy wide whack. Okay. We take that whack and then we then go and look at firms and then intellectually, the largest most unlevered firm is going to have the lowest cost of capital and the smallest highest levered firm is going to have the highest cost of capital.

**Adam:** 01:23:11

What's the scaling factor there?

**Rafael:** 01:23:15

It depends on their size and leverage, to be honest with you. It depends on their loading of size and leverage. Leverage has a bigger effect than size. Right off the bat, I don't remember the loadings. Again, we literally did this 25 years ago, and I haven't ...

**Adam:** 01:23:30

Yeah, yeah, I know that. I'm sorry, I don't mean like ...

- Rafael:**           **01:23:32**           But leverage has a bigger loading than size.
- Adam:**           **01:23:36**           Okay. So, that's informative, but also like, if a company is 10,000 times larger than another company, obviously, the cost of capital is 10,000 times ...
- Rafael:**           **01:23:47**           No, right. Right. Sure. That was a subjective secret sauce. Yeah. That was the subjective... You have a lot... With all of these things, there's like, it's kind of like chess, there's an infinite number of decisions you need to make. And that's why I think it's so important. If you evaluate a model, you need to see it live, out of sample applied. Because someone can go and build a valuation framework today, and fit all the data historically, and it works great historically.

But let's see what happens when you have a tech bubble. Let's see what happens when you have a financial crisis. Let's see what happens when interest rates go to zero. I mean, you really need to see it and you need 20-plus years of live data to have any idea that it works. So, those are things, that's the way we kind of constructed cost of capital. Every week, we estimate what is the cost of capital to markets around the world, then we assign a company specific cost of capital to discount those cash flows.

Now, one of the things, I think one of the advantages of having a valuation framework that, at least to us, we've been able to prove to ourselves that it works and we see it empirically in terms of the factor work we do and so and so forth, is that, we can then go in and start to ask different questions. You know, we did the analysis that I mentioned with Cisco, where we figured out how much did they have to grow to justify their price. We created this process called *value expectations* back in the '90s where you back into different value drivers. But we can also say, what if we take the cost of capital and we increase it 50 basis points?

And then we look at the overall market. For the overall market on just -- on a pure, no emotion, no holds barred, you change the cost of capital by 50 bips, equity market should drop about 7%, not too far off of where they've dropped year to date. Increased at 100 bips, within that little span, you can more or less do-- duration is not linear, but more or less double it. So, if the expectation is 100 bip increase, and I don't think even if Fed rates went up 100 bips right now, the equity risk premium is actually quite high, very high relative.

And that gets back to kind of my view of the basis of our bet for brunch in Bangkok, 10 years from now. I'm kind of banking on the fact that the equity risk premium is relatively high compared to what it is historically. So, even though interest rates go up, I don't think it gets absorbed one for one inequity

rates. But even if it did, let's say it did, you're talking about maybe a 14% drop from where we were at the end of last year.

Now you split that up by duration, take the same list of companies, the S&P 500 and split it up on the basis of the ones that are being affected the least and the ones that are being affected the most. Just a simple 50/50 sort, right? The ones that are being affected the most, again, in rough numbers, they should be down about 8%. If it goes up 100 bips, they should be down 16. The ones affected, the lease should be down about six, they should be down about 12. Even the low duration stocks, again, not at the extremes, but in very rough, conceptual terms, everyone's going to get hurt by rising interest rates, right?

What I think is interesting is again, I know my number, I know, my estimate is absolutely wrong. But I also know through time, my valuation model, our valuation model does a good job explaining prices. And as we change discount rates, it adjusts kind of what market prices have been through time. And even though it's wrong, at least provide the basis to not have the boogeyman under the bed. How much, you know, people -- is the market going to drop 20% with that 100 basis point drop 40%? I think you can at least have a basis to start having a rational conversation with clients and prospects to keep them focused on the long term that we've had lots of 20% drops in equity in the market through time. And over time the market tends to recover. You know, when we look at -- there's been so much chatter by the quant value people that we're at historic mis-pricings, right? The last graph, I'll show you, because I just think it's really fun, one last ...

- Adam:** 01:28:04 Yeah, do it, let's do it. Yeah, I love it, it's controversial.
- Mike:** 01:28:06 I know Richard, you may have to pop off. So, if you do, then no problem.
- Richard:** 01:28:10 But I can't miss this last part. So, I ...
- Mike:** 01:28:12 I know, I know.
- Rafael:** 01:28:13 We'll take you here and this would be a great point to pause for another podcast in the future and make sure everyone goes back and like, who killed J.R.
- Mike:** 01:28:24 The Dallas ...

Rafael: 01:28:25

You know what, I am a product of the '80s. There's no doubt about that it. Music and clothes style, all of it. All right. Let me see where this graph is. Let me find that real quick. Okay. These two lines here basically plot what we call *the intrinsic value upside*, which is again, intrinsic value divided by price minus one. And it plots it to two portfolios. It plots it to high Book to Price or the cheap stocks, to low Book to Price for the expensive stocks.

During the tech bubble, the spread in intrinsic value upside between the cheap and the expensive stocks is about over 100%. The quant value guys made brilliant calls that made a lot of reputations and that's wonderful, certainly warranted. That was a great move. But from an intrinsic value perspective, we saw the same thing. Now what's interesting is, for us, value and growth has been more or less evenly priced over the last 20 years. Except I'd say 10 years ago, growth became much more attractive than value. And that held until about August of 2020.

This chart over here on the right shows the difference between these two portfolios. So, you can see during the tech bubble, from an intrinsic value perspective, cheap stocks were 100%-plus more attractive from an intrinsic value perspective than expensive stocks. And then for much of the last 10 years, this is the zero line, here, sorry, this is a zero line here, growth stocks were more attractive than value.

More recently, starting at about August of 2020, we saw value becoming more attractive than growth. And that's certainly the point now. But I'd say it's about a third as attractive as it was back in the tech bubble. I see nothing historic about this mispricing today.

What I do see going back to what conflates a ratio, Apple, Alphabet, Facebook, Amazon, these are extraordinarily profitable companies. These are not pets.com. These companies generate prodigious amounts of earnings and cash flow, you have low cost of capital, and these companies have high growth opportunities.

A multiple, of course, is going to reflect these companies as having a high multiple. Has nothing to do with whether they're under or overvalued. A multiple is going to say they're expensive, because again, it conflates profitability, growth, risk and competition. Those companies account for what, 25% of the S&P, plus or minus, somewhere in there? Of course, multiples are going to be high. So, yeah, granted, multiples may be at all-time highs. But from an intrinsic value perspective, which has a pretty stellar track record,

these companies are certainly not trading at historic opportunities for growth versus value.

Now, what might work out really well for the value guys is the fact that they're lower duration stocks. And if you get a big run in interest rates, it's kind of like just being at the right place at the right time, bus stop investing, the cycle comes and goes, as long as you stay in the cheap stuff. When interest rates start to go up on a relative basis, you'll do well. But you know, the thing is, from the perspective of what drives value investing, when you hold constant intrinsic value, the gains to value investing kind of go away. And this was in that white paper we wrote where we kind of laid out our asset pricing model, but it's what we call deconstructing value.

And again, you have the 30-40-30 portfolios. And this row is the cheapest set of stocks, the most attractive Book to Price stocks. This is the most undervalued stocks. The intersection does pretty well, 9% annual returns. But when you have fairly priced or overvalued stocks that have an attractive multiple, these stocks only returned about 5.8%. So, it really kind of, to me, gets at the heart of you know, this Book to Price or multiple investing is really kind of a correlation story, not a causal story. To me, the causal story is the stock's over or undervalued. And multiples are somewhat correlated to that and that's fine. But you've got to do a lot of work to sort out, sift the wheat from the chaff here.

Regardless of whether a stock trades at a high multiple, again, this is 1998 to the end of the year, to end of 2021 live data out of sample data that we've been delivering to our clients. If a stock is undervalued, it doesn't matter whether it's a higher low multiple. And the same lesson applies to duration stocks. In the current quarterly letter, when we broke down the sensitivity of stocks to changes in interest rates, I also did something else that I thought was kind of fun, was I broke down stocks on the basis of sensitivity, implied future growth. So, stocks with higher implied future growth, all else equal, are going to be more sensitive to discount rates than stocks with lower implied future growth.

So, when we do that and we break that group of stocks up on the basis of whether they're overvalued or undervalued, undervalued stocks, whether you have high or low sensitivity to discount rates, return about the same. Overvalued stocks, certainly the low interest rate sensitivity group is a little better, but 60 basis points. The bigger issue is the spread between undervalued and overvalued regardless of whether you're interest rate

sensitive or not. That tends to run about 200 basis points plus or minus 130 basis points to 200 basis points.

When you look at the same thing on a Book to Price basis, Book to Price does really well with low interest rate sensitive stocks. The cheap Book to Price stocks have a great return. But when you have high interest rate sensitive stocks, cheap Book to Price stocks have absolutely no explanatory power. That's the worst performing bucket even though those are the cheapest stocks. So, again, it gets back to you need a, I believe, you just need a complete system to really evaluate stocks. You can keep adding more and more factors to try to plug the holes, but eventually you run out of fingers to fill up the dike, to plug the dam.

- Adam:**            **01:34:49**            I love it. Okay. Well we didn't get to fully explore this idea of duration. So, just maybe to quickly close a loop and then maybe we'll tie the knot on this and defer to a future conversation. But am I right that your calculation of duration is pretty close to one over cost of capital?
- Rafael:**            **01:35:12**            No, absolutely not. And the reason for that is that whole economic profit horizon completely eliminates that perpetuity piece into forever. So, our duration is literally we're going to forecast out the cash flow systematically through all these firms. And we're going to tweak the cost of capital up and down to figure out their sensitivity just like ... Yeah, just like a bond. I mean, I think that's one of the advantages we have with our framework is we're able to directly bring this concept to bear on constructing portfolios, and that's kind of where our current research agenda is taking us now.
- Adam:**            **01:35:49**            Interesting. Okay, fantastic. Well, yeah, we got to get you back on to talk more explicitly about the duration concept. I know you're doing a lot of work on that currently. And I'm personally very interested in that, because ... from a perspective of like we do sort of strategic asset allocation, and we talked about the idea of risk parity. And the traditional way of balancing risk between stocks and bonds in a risk parity framework, is to do it by equilibrating their volatilities. But that's a very poor proxy for the relative risk at different points of the cycle. And given the constitution of the equity index, etc., I'd much prefer the idea of equilibrating on duration. So, just maybe, like, for example, I don't know if you know off the top of your head what is the current approximate sort of Macaulay duration type duration of the S&P, you have a general ...

- Rafael:** **01:36:51** A 10 basis point, a 10% change in the S&P approximates to 7% change in its value. 10 basis point. 10% change in the cost of capital or 50 basis points, approximately 7% change in its warranted value.
- Adam:** **01:37:08** Okay. So, in traditional duration, it's sort of 14-15.
- Rafael:** **01:37:13** Yeah.
- Adam:** **01:37:14** Interesting. So, not much higher than the Barclays Ag. Like I would have thought it would be way higher than 14-15. That's remarkable. Okay. All right. Well, anyways, let's tie a knot in it And Rafe, where can people find you?
- Rafael:** **01:37:36** AppliedFinance.com, @AppliedFinance at Twitter. At Applied Finance is probably the easiest place. As you know, Adam, I tweet a lot more about food and travel on my personal account than I do about finance. But every so often, I get snarky on there that doesn't necessarily show up on the corporate account. But at Applied Finance is the place to get kind of the great thinking from all my super smart partners that make our company really stellar.
- Adam:** **01:38:05** Very cool. Well, oh, also guys, just a reminder, if you enjoyed this conversation and if you want us to be able to get the same caliber of fantastic guests on, then please Like and Share. Obviously, the more support we get from you, the easier it is for us to source high quality guests. So, appreciate your support. It's a win-win. And Rafe, thank you so much for sharing, and for all this... Yeah. I'm with you, man. I could go on for a lot longer. Maybe if it wasn't late on a Friday afternoon and my wife wasn't scratching at the door.
- Mike:** **01:38:47** Which door? The door that you're at to get in or the door you locked her in to get out? You heard that joke about putting your dog in the trunk of the car, your dog and your wife in the trunk of the car and you know your dog loves you because it's happy to see you when you open the trunk?
- Rafael:** **01:39:02** That's hilarious, man.
- Mike:** **01:39:07** Anyway, on that note...
- Adam:** **01:39:09** That's a great place to finish. Happy weekend, everybody.
- Rafael:** **01:39:12** Thank you. A lot of fun. Take care.

**Mike:**            **01:39:15**            ...

**Adam:**           **01:39:16**            Yep.