128 TIP: Edward Thorp – A Man for All Markets

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Broadcasting from Bel Air, Maryland, this is the Investors Podcast. They'll read the books and summarize the lesson. Don't test the waters, tell you when it's cold. They'll give you a sensible investing strategy. Your host, Preston Pysh and Stig Brodersen.

Hey, how's everybody doing out there? This is Preston Pysh, and I'm your host for the Investors Podcast, and as usual, I'm accompanied by my co-host Stig Brodersen out in Seoul, South Korea. And folks, we have an incredible guest with us today, an absolute legend to be honest with you, and his name is Edward Thorp. And I want to start off by telling a quick story about Dr. Thorp before we begin this episode. So about a year ago, we had a really famous author on our show, his name is Jack Schwager, and he's the author of the Market Wizard series books. And for anyone that's not familiar with these books, Jack Schwager goes around the world and interviews the smartest investors on the planet—most of them are billionaires—and then he outlines the key aspects of their investing approach. So we had the honor of interviewing Jack Schwager on our show, like I said, about a year ago, and during that interview, one of the questions that I asked Jack was, "You know, you've interviewed all these famous investors, these people like Ray Dalio, you name it, he's interviewed them, but I said, who is the person that you would say is the smartest person that you've ever talked to?" And before I could even finish that sentence, Jack interrupted me and he says, "Oh, this one's easy, it's hands down Ed Thorp." He said the guy's on a completely different level than anyone else I've ever interviewed. And so, Dr. Thorp, I wanted to start off this episode embarrassing you a little bit with that story, but also, in all sincerity, just to tell our audience the company that we're with today and to let you know that we are so honored to be talking to you on our show.

Ed Thorp: Thank you very much. I didn't know that story.

Interviewer: All right, so if you guys want to know just a couple of Dr. Thorp's accomplishments, I'm going to run through three of them real fast before we start this conversation that gives you some context of who we're dealing with here. So first, if you've ever heard somebody say, "That person's counting cards," when you're talking about the game of blackjack, that whole idea was invented by Dr. Thorp. He literally invented card counting. And so this all started whenever he wrote this world-renowned book, and the name of the book is Beat the Dealer. The book was written back in 1962 and it sold well over a million copies, and this book was pretty much the benchmark. And we're going to get into a little bit of this conversation with Dr. Thorp during the show, but he figured out the mathematics of card counting and then wrote an entire book around it. In fact, there was a movie about MIT students, it was called 21, the Hollywood movie about MIT students using the techniques that Dr. Thorp wrote about, and they went to Las Vegas and beat the odds of the casino.

The next thing that I want to highlight about Dr. Thorp that people might not know is that he is literally the Warren Buffett of options and derivatives. So chew on this fact: Dr. Thorp had a positive return for 227 months out of 230 months trading options. So if we actually subscribe to the efficient market hypothesis, that means that there's a 50% odds of beating the market each month. This means that the chances of him being able to do that for 227 months out of 230 is near impossible. In fact, the odds are 1 out of 10 to the 63rd power, or in another way, you have a 1 in trillion times better chance of randomly selecting an atom on Earth than getting similar results. So that's the second thing that I want to highlight, and he went on to have an enormously successful trading career with returns in excess of 20% annually for 29 years, just to kind of give you a glimpse of how he performed in the market.

The last thing that I want to highlight about Dr. Thorp here—and I see he's smiling and probably a little embarrassed because I keep talking about all of this, but I think it's really important that our audience knows this about you, Dr. Thorp—the last thing that I want to highlight is that he was the first person to invent the first wearable computer. And now this is on display up at MIT, which is where he was a professor, and the computer was made because he had a theory that you could use Newtonian physics to predict where the ball might land on a game of roulette. And it turns out he was right. You actually can predict where the ball is going to land on roulette if you know the velocity of the speeds going, and he created a wearable computer that he put in his shoe that then told him in his ear—and mind you, this is back in the 60s that he did this—where the ball was going to land. So these are some of the things that we're going to be talking about today's show among many other things. These are all outlined in his new book that just came out this month, and the name of the book is A Man for All Markets. And as a person who read this book, I can't highly promote this enough to our audience because he goes into all the details on how he did these things, what he was thinking about whenever he created this. So Dr. Thorp, fantastic book. Let's jump into the first question and get this interview going. Let's talk about the blackjack. I'm really curious to know how you harvested this idea of how you could maybe beat the odds of blackjack when everyone in the world had the exact opposite opinion that it could never be done.

How did you go about thinking about this?

Ed Thorp: Well, for formulas, and if you could solve these formulas exactly, and you can figure out the precise probabilities of when you're losing given any collection of cards that the dealer's coming from, whether it was a full deck, any partial deck, or any number of decks or number of person packs. So what I did was I had the computer take out four aces from the pool, and then it told me what happened, and it shifted in favor of 15%. I cried a lot, almost 3%. So I thought to myself, "Well, that's good news, because for the next operations, it probably will shift the other way." I think the same amount. So as soon as I saw that result, and you move that had a limit, but I went with all the twos, threes, fours, and so on. The upshot was, when all the smoke cleared, when the deck was rich in big cards, it shifted the edge in favor of the player, but when it was rich in small cards, it shifted the edge in favor of the casino. So the player wanted small cards to come out of the deck rather than big cards, and for the casino, it was better for them as big cards were used up. So I developed a card counting system, actually many card counting systems. Then the real work started, which was actually doing it. So I spent about the next year, first with hand calculations—it can't get very far as the problem is too big—and then I went to MIT for my appointment there, and I found I could use a high-speed digital machine, an IBM 704. In the early days, computers were scarce, but the government was starting to come online. This is the refrigerator-sized machine. It served 30 New England universities, and I was able to use the machine, but I spent almost a year [unclear] myself on a program and running a subroutine, but I was putting it all together into an overall program that enabled me to evaluate how the cards affected the game.

Interviewer: So I'm curious, do you think that you would have been able to solve the math behind everything that you were trying to calculate back at the time point when this was occurring if you didn't have access to that computer in that computer lab?

Ed Thorp: That's an interesting question. At the time, I thought I needed to do as exact a calculation as I could, but as I learned more about the game, I realized that there were ways to approximate the problem. It would have given me a pretty good solution, and I probably could have gotten that pretty good.

Interviewer: All right, so Dr. Thorp, one of the things that we constantly see as a theme on our show is the similarities that exist between gambling and investing with respect to probabilities. So Charlie Munger, Warren Buffett are super famous for talking about expected value. If they feel one decision's going to give them a 75% probability, another decision will give them a 25% probability, they're going to take the resultant of those probabilities and make an informed decision. But where I think a lot of people miss the other piece of that conversation is how it relates back to position size. So we had a really intelligent member of our community on Facebook that proposed this question, his name is Patrick Buchanan, and Patrick tasks us to ask you, how can one apply the Kelly criterion to the stock market given the large array of potential outcomes and holding periods? So if you could kind of give our audience a little bit of an idea of what the Kelly criterion is and how it relates to expected and probable outcomes, it'd be really beneficial for people.

Ed Thorp: Okay, first a little about the Kelly criterion. The root idea is there is a trade-off between risk and return. This is well known to almost everybody in investing, but the question is, what is the trade-off? How much should you bet when you have an edge, and how much should you cut back to allow for the risk that is associated with it? And for a very simple situation like tossing a biased coin, suppose the coin has a 60% chance of coming out heads and 40% chance of coming out tails, and you get to bet on heads or tails, clearly you keep betting heads, but how much should you bet? This is the basic problem that I faced in blackjack. It was very much like it, going to odds that might have been 52/48 or 51/49, meant to center for percentage, how much to bet? And the Kelly criterion is the solution to that problem and also a much wider collection. And in a simple coin toss case, this is where you have uneven money payoff, so in a 60/40 coin toss, you bet 20% of your bankroll. That, by the way, is fairly scary to people, the reaction to it, because there are pretty wide swings. So if you only bet about half as much as what Kelly said, you end up growing in about three-quarters the...

Interviewer: Rate you would have three quarters the rate you would have done the whole thing and your risk is cut down to half so you feel a lot better. So I generated recommending people just half Kelly so it won't get scared. So I'm curious if there is a rule of thumb that you use when conducting that math that you just talked about?

Ed Thorp: The Kelly criterion is fairly involved if you have real-world situations with many possible payoffs and also with uncertainties. So people have done a lot of work on that and they solved a lot of the problems explicitly. The best compendium of information, but it's very mathematical, is a book called "Kelly Capital Growth Investment Criteria," and the publisher is World Scientific and it came out 2010, about 700 pages. There are three editors, myself and Leonard MacLean and William Ziemba. So I would recommend that for math types who want to dig into this further.

Interviewer: So I'm really excited that you brought that up because I was not aware of this book, and the Kelly criterion is something that I'm very interested in learning more about. Specifically because in a book that we read probably two years ago, it was by Tony Robbins where he profiled a bunch of different high-profile investors, and one of the people that he interviewed was David Swensen who manages the Yale endowment, which is a multi-billion dollar endowment. And the thing that I really remember about that interview with David Swensen was that he talked about this idea that you can't time the market, but what you can adjust is your position size and to mitigate risk. And I really remembered how much he emphasized the importance of position size. And I think for a lot of people listening to the show, if you're really wanting to understand mathematically what the most optimal position size is based on what expected values you expect to have, the Kelly criterion is what you really need to know and understand. And so knowing that you've written a comprehensive book about the Kelly criterion is really exciting to me, and I'm sure many of our audience members will be just as excited to hear that.

Ed Thorp: I'd like to share one more thing about the Kelly criterion, which is it has world-scale applicability. If we look back into the various bubbles and disasters that we've faced over the last century, most of them come from too much leverage. And from the framework of the Kelly criterion, it means you're betting too much. And the Kelly criterion, when you work through the theory, shows you that if you bet too much consistently, you will be ruined. That's like some of the disasters that we've gone through. There was the crash of 1929 where people were buying stocks on 10% margin. There was the crash in 1987 where they were using portfolio insurance, and that tended to lever their portfolio in various curious ways. And there was the Long-Term Capital Management disaster in 1998 where they were levering at 30 to 1, if not even 100 to 1. And our recent disaster in 2008-2009, banks were levered up like 33 to 1, and the banks that got that privilege, two of them are gone, three of them had to be bailed out by the taxpayers. So the Kelly criterion applies not only in the small for individual investments, but it applies in the large for nations.

Interviewer: Alright, so Dr. Thorp, based on what you just said, I have to ask this question because I know everyone in our audience that's listening to this interview is thinking the same thing, and that is how do you see the market today? And when I say that, I emphasize a couple things. The first one is just this morning I was reading a report or an article on Larry Fink who's the CEO of BlackRock, his company's a multitrillion-dollar kind of business handling securities, and he says, "You know, it's not looking good, it's actually looking pretty scary." And whenever I think about where we were in the 2008 crisis at the end of that credit cycle and where we are now at the top of the next credit cycle that we're in, we have a lot more credit added to the system this time around. So whenever I look at, call it the stock market, and I think about systemic risk, which is, you know, when credit contracts on a macro scale, how do you think through position sizes and what's your expectation from this point forward considering that we may be at the top of a credit cycle? How do you think through that?

Ed Thorp: I think it might have been JP Morgan that somebody asked this question, they said, "I'm worried about my stocks, should I sell?" So here's the advice he gave: "Sell down to the sleeping point." I like that. So as far as asset classes now, it's really hard to know whether you're in a bubble and if you are in a bubble, when it's going to pop. It's a lot like the chaos theory image of dripping sand onto a little pile that's shaped like a cone on the beach. The pile gets higher and higher and finally, suddenly, there could be a little avalanche, the pile will shift and slide out, or the same thing with real avalanches in the Alps. You never know quite when it's going to go, but you know that if it keeps piling up, eventually something will trigger it and you'll have a disaster sometime. Right now, we have an attack on regulations that rein in banks from levering up and also the reining in of the derivatives industry. It's highly probable they've taken too much risk, and the more those regulations are removed, the more these guys get a chance to lever up, and the more chance we have of a rerun of 2008-2009. Now, they're not particularly worried about it because the taxpayers bailed them out last time for the most part, and they probably count on that. They basically control a wide swath of people in government, they can make sure it's going to happen. So it's basically, "I take the risk, you take the losses."

Interviewer: Alright, so I have another question for you. So one of the narratives that we hear a lot of very smart people talking about is the idea that the next financial event that occurs is going to be one induced by central bankers and a distrust of central banking. So one of the narratives that we heard from a guy, Jim Rickards, who's a New York Times bestselling author that relates to a lot of this kind of stuff, is he said, "You know, back in the late 90s we had the Long-Term Capital crisis which, you know, potentially could have brought down the markets. The next credit cycle we had the banks that all needed bailed out." He said, "The one that's coming is going to be the central banks that need bailed out." And he talks about this escalation because of more derivatives, more credit that's being added into the system each time we create another cycle. So my question is this: Do you see the next cycle being induced by central banks?

Ed Thorp: I don't know the answer to that.

Interviewer: I love that response. And I guess I, you know, this is a really profound moment for me to hear you so quickly default to a 50 percent probability on something that I guess I was expecting you to really talk about more. And that's not something that we normally see, and that's not something that I normally do, and that's something that I can really learn a lot from is just how quickly you are able to come up with such an intelligent response to something that most would probably pontificate on. And I know you just provided such a quick snapshot of time, but what I immediately think about based on the way you responded to that is something that we hear Warren Buffett talk a lot about, which is have a really strong understanding of what it is that you know versus what you don't know. And I really like the way that you just responded to that.

Ed Thorp: Well, I've read a good book recently that set my mindset on these things quite well. It's by a psychologist at, I think, the University of Pennsylvania named Philip Tetlock, and he has a co-author, a journalist named Dan Gardner, and this book is called "Superforecasting." So Tetlock has been working on the idea of whether people can forecast better than chance, and he found, as I have over a lifetime, that so-called experts don't really have much to tell us that's of value. They basically get a lot of press, a lot of media attention because they make strong, definite claims about one thing or another. But strong, definite claims are usually not the stuff of accurate predicting. We can only see the future very fuzzily. So there are a lot of possibilities, you have to kind of weigh them and think about them. You find out that the people who go at things that way can make somewhat better predictions on average than chance, and also better than the people who don't think that way. So the whole book is about this kind of thing. So my view is that on most things we can speculate about lots of possibilities, but it's difficult to get enough of an edge to actually put money down and expect to make a profit. But it's worth speculating anyhow because you can be ready at least psychologically for the bizarre range of things that might unfold.

Interviewer: So I might be reading into things too much, but you know, looking at your facial expression and the way that you responded to that question and so quickly to say "I don't know," I kind of caught a glimpse that you wouldn't be surprised if that was the case that played out, but you just don't necessarily have enough information in order to confirm or deny. So that's why you're at the 50%.

Ed Thorp: That's right.

Interviewer: All right. I'd like to talk more about your investing career because even though we talked about blackjack and how you made a name for yourself in the blackjack space, you also have more than 30 years as an investor and, as Preston was saying at the beginning of the show, with an annual return of 20% over that time period. So could you tell us about the transition that you're making from being an author, being in academia, and into something that might be even more complex, working with options, warrants, and other financial instruments?

Ed Thorp: I'm not sure where to start there. But I was interested in investing because I made some money gambling and I made some money from the [unclear] piece, and that meant I now had for the first time in my life a certain amount of capital. So after having done badly in investments, I said, "I better put my mind to this thing." And I got in the mail that I sent away for something called common stock purchase warrants, and those were basically options issued by companies. They were traded over-the-counter, that is, it was basically a telephone market. And since I read about them, I realized that I could get rid of most of the risk in investing and so capture some extra return if those warrants weren't priced correctly. And there was every reason to think in a telephone market that they would not be priced correctly quite often. So that summer I came out to the new UC Irvine campus. The first day I ever met an economist that was also a new professor there, he had written his thesis in 1962 under a very famous economist named Arthur Burns. His thesis was on common stock purchase warrants. So we hit it off right away with a big exchange of ideas, and we decided to meet every week to improve theory and improve his investment returns. And the man we kind of... [unclear]

Ed Thorp: We went our separate ways investing for people. We each had our little collection of people as invested in hedges. We made about 20 or 25 percent a year. Undergraduate position, you see, I was a National Academy of Sciences member. Allergy, he had become one investors at that point in 1968. The markets were manic, anyhow. There was a dispute about it and we thought, play bridge on. We got together, wise for dinner and so forth. Awful was actually evaluating me for Gerard, but apparently it went well because Gerard moved his money over to me. So that my radar and I realized that he was very smart, very dedicated, long-term compounder. His life was securities, which guy understands long-term compounding. Very smart, he's going to be maybe the richest guy in the United States one day. Turned out there were times when he was. I then realized, confirmed that or efficient way to operate was to have a limiter furnish, start set up the first quantitative market neutral hedge fund.

Interviewer: All right guys, hang in tight because we're going to take one minute to tell you about today's sponsor at The Investors Podcast. Stig and I always talk about how important it is for you to think like an owner and not as an employee, regardless of your job description or title. Anyone that owns their own business or perhaps works as a freelancer knows that accounting takes up a lot of time. In fact, accounting alone might be the reason that you're hesitating to start your own business. That's where FreshBooks makes it a whole lot easier and a lot faster, and that's why Stig and I personally use this for our own accounting software. It doesn't take more than a few clicks to send an invoice or to simply track everything that's going on in your business, from breaking down all of your revenues and expenses to see how much you owe and how much others owe you. You really need to see this to believe it. And if you check out our show notes for this episode, we've created a short video that shows you how to go step by step to sign up and use this very simple software. This is the best part: if you go to freshbooks.com/TIP and use our bonus code TIP, which stands for The Investors Podcast, you'll get free access for 30 days. There's no credit card and nothing else that you need to do, and you can cancel at any time. That's freshbooks.com/TIP. All right, now back to the show.

This story about Warren Buffett really brings me to the next question. It's an idea that Buffett has been really famous for, and you also write about that in your book, and that is the idea that the vast majority of investors should actually stick to ETFs instead of buying, for instance, individual securities, which might surprise a lot of people because that is what Warren Buffett did and why he is so financially successful. A lot of people in the value investing community are interested in hearing your thoughts on that too. Why do you think that the majority of investors should invest in ETFs?

Ed Thorp: What I found over 40 or 50 years of doing this, actual normal 50 years of your life, what I have found is that you can find situations that give you excess return, but it requires quite a bit of work to find them. So there are really simplistically three groups of investors. There are investors who don't want to do a lot of work, do as well as they can without doing a lot of work, so people like that should buy indexes. And the reason is that index investors do better than maybe 90% of all the other investors. All the other investors are busy paying fees to investment advisors. Then the second group of investors are people who would like to learn more about securities and they're entertained by following them and trying to think about them and analyze them, and I say to those people, "Now, go ahead and do it." You may pay for the education, you may have a good time in doing all this, and you may learn something, and who knows, you may find some special unusual things that are really pretty good. Then the last category are the guys who make the big money in the market, who have usually a fairly large staff, large capital resources, and often a staff and charge other people fees for doing it, and the fee chargers end up making most of the money. So keep that in mind, don't expect as a small investor to be able to be killing it.

Interviewer: All right, the doctors, the... this is a question that I'm really excited to ask you because we always ask each one of our guests to come on the show to tell us what the most influential book—and you can name more than one—that has shaped your life or influenced you in a special way. If you could share that with our audience, we'd appreciate it.

Ed Thorp: The first book that really influenced me in a qualitative way was a book from the MIT Press that I read by Paul Cootner, came out in 1964 initially, and it's called The Random Character of Stock Prices. And it was a collection of quantitative type papers, maybe the very first quantitative papers that began appearing. And since I was thinking about the market in a quantitative way, it fit right in with my bench at the time, and that had a considerable influence. I mean, in fact, they had early models in there which weren't a solution to the warrant and option problem, but they came close to me to actually figure out the option formula when I thought about what they'd done.

Interviewer: So, Dr. Thorp, we can't thank you enough for your time. This was just fantastic to just meet you. I can honestly say I'm honored. Stig and I have been following you for a long time, four years at this point, and we really admire your contributions, especially from a mathematical standpoint of how to think and how to think about probabilities and just all those things. We can't thank you enough for that. Most importantly, we can't thank you for your precious time that you shared with us today, and our audience is going to benefit from this tremendously. I do have one question I've got to ask you. When I was reading through your book, there's a picture of you in the back, and I looked at the book and I said, "Well, he's younger than I thought," because I know you've done all these things from back in the 1960s and such, and I'm looking at this picture of a person who looks like they're probably 55 years old. Well, when I read through the bio, you're 84 years old.

Ed Thorp: Well, that's an interesting question. I actually had that question quite a few times, and I did a poll a couple years ago. I go up to strangers like waitresses in restaurants or librarians or whatever, and I say, "I have a question for you. I'll pay you a dollar to answer my question, and then about me, not about you, so don't worry. And if you get an answer to, shall we say, I'll pay you an extra $5." The question was, "How old am I?" And if you come within five years, you get the five dollars, and no one's ever collected. They always guess between 55 and 60. I asked this for some very old lady, she guessed I was 72. Check it, is everybody 72 at least, aren't they?

Interviewer: So what in the world is the secret? If you can give us one final tip for longevity, if you can give us one tip that we look that good when we're at the same age as yourself, so what is it? What is it that you do different?

Ed Thorp: Well, let me just say first, laughter, after that picture's almost three months old. So now, I thought about this, but I like being alive and doing things and learning things and enjoying people and traveling and so forth, so I want to be around as long as I can. So part of my thinking is exercise, so I ran marathons for 40 years or so, and that was a great fitness filter, and now I do a lot of walking and working out with a trainer in the gym. The second thing is what I eat. I try to in limited quantities and fairly healthy food most of the time. I don't eat healthy food all the time, but I do a fairly good job of it. I never smoked, I never played football 'cause I didn't want to bang my head. Even as a little kid, I understood what concussions was. I've got another thing is to get medical tests regularly, so you find out something really in the beginning.

Interviewer: Well, there you have it, folks. There's the really valuable information. So, Dr. Thorp, we can't thank you enough. Thank you, thank you, thank you, sir, for coming on our show and talking with us today. I know everyone got a lot out of this, and we really do appreciate it. So, everyone who's listening, the name of the book is A Man for All Markets. I have read it cover to cover, and I can tell you it is a fantastic story that will give you plenty of insights. All right, guys, that's all that I had for this episode of The Investors Podcast. We'll see each other again next week.
