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Andrew Ang, PhD: Including Factor Investing  
in Portfolio Design



**INVESTMENTS & WEALTH INSTITUTE®**

## ANDREW ANG, PHD

# Including Factor Investing in Portfolio Design

*Andrew Ang, managing director of the global investment management corporation BlackRock, Inc., coordinates the company's factor investing, an investment strategy targeting broad, persistent factors that shape returns across asset classes. He also leads BlackRock's Factor-Based Strategies Group, which seeks to optimize the use of factors to help achieve explicit investment outcomes, reduce volatility, and enhance diversification.*



Andrew Ang, PhD

*Ang's career has focused on identifying and making use of the risk premiums associated with various factors within and across asset classes. His numerous publications have dealt with equities, fixed income investments, asset and factor allocation, and alternative assets. His book *Asset Management: A Systematic Approach to Factor Investing* is a comprehensive guide illustrating how factor risk premiums can be incorporated in portfolio design and other aspects of investment management.*

*Before joining BlackRock in 2015, Ang was the Ann F. Kaplan Professor of Business at Columbia Business School, where he chaired the institution's Finance and Economics Division. He earned a Bachelor of Economics degree with honors in actuarial studies from Macquarie University (Sydney, Australia), and an MS in statistics and a PhD in finance, both from Stanford University.*

*In February 2020, Andrew Ang spoke with members of the Journal of Investment Consulting editorial advisory board about factor investing—its fundamental economic basis, its past performance, and its role in the future. Taking part in the discussion were Inna Okounkova, Columbia University and editor-in-chief of the Journal; Mark J. P. Anson, The Commonfund; Edward Baker, Mesirow Financial; Ludwig Chincarini, University of San Francisco and United States Commodity Funds; Philip Fazio, Merrill Lynch; and Geoffrey Gerber, TWIN Capital Management.*

**Inna Okounkova:** Thank you for talking with us, Andrew. We would like to start with some introductory questions about your career. First, what major factors helped to shape your career and bring you to where you are today?

**Andrew Ang:** One way to describe my career is that I've always been different. I think being different is at the heart of factor investing because you want to look through to the things that matter. You focus on proven, academically rigorous sources of return, which means your approach is a little different from the status quo in markets or from what other people have traditionally done.

I was born in Malaysia, and during the late 1960s and early 1970s, Malaysia went through a series of race riots. My parents wanted a safer place to raise their family, and when I was very young, they migrated to Perth, Australia. That's where I spent my formative years, and I'm proud to be Australian. We were one of the first Asian families to move to Perth, and I remember clearly that I was the only nonwhite child in my class. Because I was different, I went through experiences in which people treated me differently. In these situations, you ask yourself questions like why is this so and does it matter? What's really important? Those are the same questions I use to analyze portfolios and build sound investments.

I did well in school, and then I left Australia to pursue a PhD at Stanford. The prevailing paradigm in financial economics today is about factor investing. It was at Stanford where I fell in love with factors as an academic pursuit. Factor investing gives you scientific information about what drives risk and return, why risk is rewarded. It gives you fundamental economic stories that can be used to improve portfolios.

As a professor, I did a lot of consulting, and I was privileged to work with some of the largest investors in the world. I had more than a decade of experience working for the Norwegian Sovereign Wealth Fund, Norway's government pension fund, which is worth about \$1 trillion. It equals multiples of the country's gross domestic product. The fund went through a tough period during the financial crisis in 2008 and 2009. I was one of a few professors brought in to analyze this very large fund. Despite the fact that the fund held tens of thousands of individual securities and used dozens of external managers plus a number of internal strategies, what mattered at the end of the

day was the exposure to factors, broad and persistent sources of returns.

I learned something not only about investments but also about a way of communicating what investment managers do. You want to buy cheap, high-quality stocks, and gravitate to safety with low-volatility strategies. You want to search for income in fixed income portfolios. All of these strategies result in long-term returns. But sometimes, like in 2008, they result in cyclical losses. Anchoring these losses in basic communication was one of the great benefits of factor investing.

As a professor, I also had the chance to meet with managers of large assets for different asset owners. One of those meetings in 2015 resulted in my being invited to join BlackRock. I met Charlie Hallac, then co-president of BlackRock, along with other senior managers at the company.<sup>1</sup> It turned out to be an extraordinary meeting. It was scheduled for an hour but ended up lasting more than two hours.

We shared information on the data and technology systems that each of us was working with. Other people joined the meeting so we could discuss these topics further, and we put up stuff on the screen. Charlie asked some really technical questions about some of the graphic diagrams. And I gave fairly technical answers. He even asked questions about code. I was thinking: This is a president of a company that manages trillions on behalf of its clients; what is this guy doing asking questions about code? Then I thought: Maybe this is a place for me. A few days later, I met our chief executive officer, Larry Fink, and I got a job.<sup>2</sup>

I realized that in order to take factors to the next level—to bring the same benefits I was achieving with large institutions to ordinary moms and dads—requires three things. The first is a whole range of investment products—and we want excellent research embedded in those choices. Data and technology are also required, as well as all aspects of outreach. I realized that in order to make a strong impact, to be as transformative as the previous revolutions in asset management, I had to leave academia, and I came to BlackRock.

**Inna Okounkova:** In your years of work in academia and industry, what do you regard as your major achievement? What were your greatest challenges and disappointments? And what is the greatest lesson you have learned?

**Andrew Ang:** I'll answer those questions in reverse order. The greatest lesson I learned was during my early PhD work. I was underprepared. I was swamped with all the new material. And I learned that you can't do things by yourself. This lesson also applied later on as I conducted research, worked with different teams on behalf of large institutions when I was consulting as a professor, and today in practice in the investment industry.

It's almost impossible to accomplish things by yourself. Achieving your goals requires building and working with great teams.

As for challenges and disappointments, I think you challenge yourself daily. The markets give you some sobering lessons, so it's important to keep a long-term focus. At BlackRock, which has tens of thousands of employees, the greatest challenge is to work coherently with a whole range of people across the organization. That's the only way we can accomplish something great.

There are always disappointments, and the one that really cuts me is if we don't deliver the performance our clients desire. Our philosophy is to adhere to the factors, but sometimes they underperform. We have to understand why. We stick to the long-term view. We stay the course. But we always want to improve our portfolios with research along the way.

I've done a lot of research over many years. The paper that got me tenure was one I wrote on macro factors in fixed income markets (Ang and Piazzesi 2003). The paper that secured my reputation was about low volatility (Ang et al. 2006). It has become one of the seminal citations in that area of study, and we were fortunate to be part of the renaissance of that large low-risk field.

But the paper I'm most proud of is not very well known, not often cited. It's a theory paper, my only paper on continuous-time theory (Ang and Liu 2007). It was published in the *Journal of Financial Economics*, and my co-author was Jun Liu, a professor at the University of California, San Diego. We came up with an interesting result: If you consider the three factors of price-dividend ratios, returns, and volatility or risk, there are actually only two degrees of freedom among them. If you pin down two of these factors—if, for example, you pin down returns and price-dividend ratios—the third is actually determined; in this case, that would be risk. Within this framework, you can actually choose only two factors out of three.

**Mark Anson:** Andrew, it sounds like you're having a good time. Putting aside financial economics for a moment, what has been most rewarding to you in the academic world compared with what's been most rewarding and perhaps challenging in the business world?

**Andrew Ang:** They're really different careers, but they have more surprising similarities than differences. At the heart of it though, I'm still an academic, and I still do research. My goal is always to bring new ideas to light, communicate those ideas, and make a difference in the world.

When I was in the academic world, I was a department chair. Dealing with talent in academia is somewhat challenging—people are tenured; moving professors is always hard. Coming to industry, I thought there's a large talent pool and employment is

at will, so it'll be fairly straightforward to hire people and build a great team. Very quickly, I learned that hiring great people is hard anywhere you are. That was a valuable lesson I learned in moving from academia to industry.

I find both worlds extremely rewarding. They're challenging in different ways, but the great thing about both of them is they're all about ideas. You simply apply the ideas in different ways.

**Inna Okounkova:** The next set of questions deals with your research and your views on investments. Much of your research and your work has been dedicated to factor investing. More recently, however, many well-known factors have disappointed, some for many years. You've already mentioned that you would stay the course, focus on the long term. But how do you convince your clients to stay the course, to stay invested in such times?

**Andrew Ang:** One experience that's been painful for many investors, ourselves included, has been a pronounced draw-down in value, which has extended for three-plus years as we speak in early 2020. According to data constructed by Gene Fama and Ken French<sup>3</sup> and stretching back to the early 1920s, this is one of the worst episodes for value we've experienced. It's been really severe. Still, we expect that what is rewarded in the long run goes through some short-term cycles.

The most important aspect of staying the course is understanding the objectives of your portfolio and having a sound underlying economic rationale for why you're taking risk in the first place. We expect value to underperform during a late economic cycle as well as during economic recessions, and we've been in a late stage in our economic cycle for some time. In fact, I think many people could have interesting discussions about why this late stage in our current economic cycle has been so prolonged. Value stocks have a lot of fixed capital, and the story I'm going to tell you is one of a conditional capital asset pricing model. It's a business-cycle explanation with asymmetric and irreversible adjustment costs.

Put more simply in laymen's terms, value stocks are hard to adjust. These companies have factories and production lines, and it's difficult to manufacture a new product or produce a new service overnight. This inflexibility really binds during a late economic cycle or a recession. Not surprisingly, their counterparts, growth firms, tend to fare better during these times. The best times for value stocks tend to be in the early stage of the business cycle when built-in business structures can take advantage of economies of scale or operating leverage.

We need to understand that value stocks earn a premium precisely because, over the long run, value's role is to compensate investors for occasional cyclical losses. To understand why

we're taking this risk, we need a secure economic foundation. Then we can consider portfolio adjustments and find different measures of value. But to stay the course, basing our thinking on a secure economic foundation is a necessary, though not completely sufficient, requirement.

**Inna Okounkova:** I agree with what you are saying. However, there are some skeptics, not necessarily about factor investing itself, who claim there are other reasons for this drawdown in many factors. Ludwig has a question in that regard.

**Ludwig Chincarini:** Because crowding has started to become an important consideration, I want to ask how the quantitative firms are accounting for the potential of crowding in their factor investing strategies.

**Andrew Ang:** I think there are two aspects of crowding. There's a short-term aspect, and there's a longer-term capacity question regarding just how much money in terms of long-run equilibrium can be invested in factors. In the short term, we like to look at investment positions at the level of holdings. We look at flows. We can look at valuations. We look at relative strength indicators. Dispersion also has some aspects of crowding because a crowded trade is becoming a trade with lower dispersion. We can capture these characteristics in different ways, but all of them are important signals that we consider in formulating our strategies.

All these characteristics are cyclical, and I think one should consider crowding indicators along with other more fundamental economic cycle indicators to determine how to position your factors and other assets over time.

**Inna Okounkova:** To continue with the capacity issue, I have a more general question about how to think about the fact that someone needs to be on the other side. You said that at BlackRock you have the goal of bringing factor investing to moms and dads, but factor investing cannot be done for everybody. How should we think about the problem that some investors need to take a position in a style that will not be rewarded?

**Andrew Ang:** That's actually at the heart of why factors exist economically. This gives us some confidence that they've not only persisted for decades in the past but, we believe, that because of our economic foundation, they will persist for decades into the future. So who is on the other side? Let's start with what makes a factor economically. All factors result from a combination of reward for bearing risk, a structural impediment, or behavioral biases. I noted that value sometimes underperforms in a late economic stage. Investors on the other side are those who can't afford to bear the losses that occur during cyclical times. But if investors are able to sustain such losses, then some factors such as value might be appropriate for them,

and they will be rewarded with a value premium over the long run. That's a reward for bearing risk.

Some factors result from structural impediments. In the world of public pensions, many institutions have very high total return targets. Other investors do too. Sometimes these investors are forced to hold high-risk securities in an attempt to meet their high total return targets, and they underweight low-risk stocks, giving rise to low-volatility strategies. That's a structural impediment that prevents some investors from holding certain securities. They are among those on the other side. Finally, some investors have behavioral biases that cause them to overestimate the probabilities of winning or to extrapolate potential returns from trends. Those investors give rise to momentum strategies, and sometimes these biases quickly reverse when sentiment changes. Because of these influences, there will always be some investors on the other side.

It's important to have a secure economic foundation because that gives us confidence that unless humans stop behaving as humans, we will automatically have investors who can bear a fair amount of risk. Unless we see changes in institutions that have more-flexible investment policies that prevent them from being forced to overweight certain securities, I think all of these factors are going to persist in the long run. We have some quantitative estimates for long-term capacity. We can base these estimates on transaction costs, and we've looked at them in terms of structural changes from, say, actively managed mutual funds to lower-cost, factor exchange-traded funds (ETFs). We've also looked at them in the setting of an equilibrium pricing kernel. In all these conditions, they echo the economic intuition I've just discussed. We believe the capacity for these strategies is in trillions of dollars.

**Philip Fazio:** I want to link in your research with regard to idiosyncratic and total volatility and realized returns that have a negative relationship. How do we construct portfolios to avoid what I'll call apparent negative risk premium for volatility?

**Andrew Ang:** The answer to this question is in one of my favorite papers about low volatility. It was published in the *Journal of Finance* in 2006. You mentioned idiosyncratic risk and total risk; subsequent authors use the term "vector" as a measure of risk or downside risk. The main result of our 2006 study was that if you rank stocks according to some measure of risk, the expected pattern of return is fairly flat for low-risk stocks, and then there's a steep drop-off for the returns of stocks with the largest risk. We called those "abysmally low returns." But the pattern of returns is fairly flat across most of the risk. Only for the highest-risk stocks is there a steep drop.

That means that in constructing portfolios, you probably try to minimize exposure to the highest-volatility stocks. You should expect long-term returns in line with the market. After all, the

market, by construction, weights large-cap stocks most heavily. So we expect to see market-like mean returns over the long run. We can reduce risk by down-weighting very high-risk stocks. And we can do this within an optimized framework behind a low-volatility series of funds, or we could do this with screens. You might have an active strategy that deliberately steers away from very high-risk stocks.

One of the interesting applications of factor investing is in the area of retirement savings, which I consider one of the major issues of our time. I think factors have a valuable role in helping with retirement savings. People need to be invested when they're approaching retirement. They need some exposure in the equity market, but what types of equity they hold matters. I hope they would hold lower-risk equities. If they follow low-volatility strategies, they will have the same long-run mean returns as the market. That's important because when we retire, we're likely to live a few more decades. Even though we need market exposure, we can get it in a way that reduces risk. Perhaps this strategy allows us to hold even more equities at that point in our lives.

**Mark Anson:** Andrew, I'm sure you're familiar with the recent paper called "Taming the Factor Zoo" by Feng et al. (2020). It's a wonderful paper out of the University of Chicago Booth School of Business. The authors point out that there are many factors out there, and they ask whether there are too many and whether there are still more potentially valuable factors to be discovered.

**Andrew Ang:** This is an important issue for both academics and practitioners. We always want robustness in the strategies we design. Backtests invariably have biases in that we tend to favor the most successful strategies. So this question is about how we can guard against too much data mining. We want statistical robustness, and we want techniques to make sure we're not overly mining our data. All of these types of tests in statistics and in machine learning are essential.

What I think these approaches miss—because they're basically only statistical approaches—is that they don't link directly to underlying economics. That's true for the paper you mentioned, plus a fast-growing body of literature exploring all these statistical techniques. What's most important to me is the economic foundation we discussed earlier. And we can confirm, to the extent that's possible with econometric analysis, these fundamental economic sources of returns.

Still, I don't think you should go the other way around. I don't think you would want to invest in something purely because it conforms to a statistical pattern. I would prefer to make sure the investment is supported by underlying economics. We should also make sure that we can implement the investment at low cost and at scale and that we can pass on the

benefits to clients. Let's apply the best, most robust statistics available, link them to economics, and make sure we can actually implement those models in practice.

Mark, you also had a question about how many factors there are. Currently, we have half a dozen factors—value, momentum, quality, minimum volatility, size. In other asset classes, we can think about carry, which is a form of income. But there are really only these six. That's been the case for decades, and I think there's likely to be only six for decades to come.

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**Geoffrey Gerber:** I recognize that your investment philosophy proposes complementing a core portfolio diversified across multiple factors. As you say, there are six. Let's say an investor wants to get his or her feet wet with a single factor or a single smart beta strategy, as it might be called in a marketing framework. If this investor were to choose one smart beta strategy as a complement to a core portfolio, which one would you recommend?

**Andrew Ang:** If we're starting with a core portfolio that is index-based and we want to move from the market to take on exposure to these broad and persistent factors, I would pick a multifactor offering that incorporates various combinations of value, quality, momentum, size, and low volatility. This approach advances the core portfolio, and it's a one-strategy or one-ticker solution. If, on the other hand, the core portfolio is made up of a combination of different actively managed funds, potentially with index funds as well, then I would add the single factor that is most complementary to what the portfolio already holds.

Most actively managed portfolios that we've analyzed tend to include value or momentum. If you consider all advisors, most incorporate only size. If we add other factors such as quality or low volatility, that's basic Investment 101, which we teach in economics. You want the most diversifying investments—assets you currently don't own—so you would add single factors to complement what you're holding.

**Geoffrey Gerber:** So if an index fund already includes large-growth, large-value holdings, perhaps a low-volatility strategy fits in well. From a correlation standpoint, some of these factors are positively correlated, and some are negatively correlated. I assume you would take that into account as well.

**Andrew Ang:** You're absolutely right. In determining excess returns, we look at factor returns minus market returns, and the correlations are relatively low. But you're right that some of them are interesting. In particular, value and momentum tend to be negatively correlated. Economically, that's because investors seeking value tend to buy cheap—cheap relative to fundamental book value or fundamental earnings. There are other combinations. Momentum takes the opposite approach. You buy stocks that are trending up, and the trends tend to continue after you've added those stocks to your portfolio. So one investor buys cheap and one buys expensive, and that induces the negative correlation between the two.

Value and quality are also negatively correlated. You can think of a basic dividend discount model in which cash flows or earnings are in the numerator, and you discount those to today's price with the discount rates in the denominator. Value tends to be a statement about that discount rate. You always want to buy with a low price relative to something. In contrast, quality is all about the numerator. If you prefer certain earnings or certain cash flows over others, value appears in the denominator, and quality appears in the numerator. That also accounts for the negative correlation.

Negative correlations of course are extremely attractive for portfolio diversification.

**Edward Baker:** An obvious question is whether it is possible to time the returns of these factors. Obviously, if one could do this, one could always be long the factors earning the premium at that moment. What is your experience in looking at such timing models?

**Andrew Ang:** I've always preferred the word tilting, because timing sometimes has a negative connotation of short-term, in-and-out, global macro-hedge-fund-like movements. That's not what we're about. You start with a well-diversified, multifactor portfolio containing all the factors for maximum diversification, and then you might tilt modestly around the edges in line with your conviction. So yes, I think it's possible to generate incremental returns around that strategic benchmark with careful tilting.

In our research, we look at how cheap a given factor is. I think all factors, like all assets, become rich or cheap. Factors also undergo trends. We call those signals of relative strength. We look at where we are in the economic cycle. I talked about value tending to underperform during a late-stage economic cycle; that's when low volatility tends to be quite valuable. We'd prefer to hold stocks with higher-quality earnings. When we come out from the bottom of an economic cycle, small stocks have large exposure in an economy that's improving. I talked about value stocks doing quite well during that time because of the companies' operating efficiencies. Finally,

the economy settles down into trends, and that's when momentum starts to do well.

We have a signal called dispersion. Put simply, you'd like to see large differences in trends up or trends down for momentum. You'd like to see large differences in high-quality earnings compared with the more junk earnings on the other side. If you see these large differences, that forecasts positive factor returns.

Looking at all these indicators, we can combine them and take positions. Today, in the early part of 2020, we favor more defensive factors, especially quality.

**Edward Baker:** I'm not the first to suggest this, but do you think that the growth in environmental, social, and governance (ESG) oriented investing might partially be responsible for the continuing underperformance of value stocks, because many value stocks, such as in the energy and materials sectors, score poorly on ESG criteria?

**Andrew Ang:** There's a lot to say about factors and ESG, and I'll get to that shortly. To answer your question directly, if you look at the cross-sectional correlations among value metrics—standard considerations such as price-to-earnings ratios—and you look at the cross-sectional correlation with ESG scores, it is close to zero. I would say some factors have significantly positive relationships with ESG, notably quality and minimum volatility. Momentum and value tend to be neutral, so there's very little relationship between those factors and ESG. Size tends to have lower-than-average ESG scores, most of which are caused by data biases. You have to have a large database to report many of these ESG metrics, and missing observations tend to be downgraded or treated less well in ESG scores calculated by most data providers.

I don't believe ESG investments are directly related to the underperformance of value. I do believe, however, that ESG stocks are an important source of returns that we can use in factor investing. You can construct factor portfolios with significant uplifts. We find 20-percent uplifts in ESG, 50-percent reductions in carbon, and we see virtually the same historical performance in the more traditional factors. So we jointly optimize the ESG and carbon outcomes when we construct factor portfolios. The cutting edge is to use the ESG data in the factor signals themselves. We've looked at these signals, and we are currently running portfolios that contain a green value signal.

We also look at patent information. Patents are a useful measure of intangible assets. They represent intellectual property and potential monetization. You can make profits within various patent classifications, but if you're particularly interested in so-called green patents, you can look at those filed under the

United Nations Sustainable Development Goals. If a company happens to solve a UN sustainable development goal and makes meaningful strides in, for example, delivering clean water or renewable energy, then I think that company represents solutions to challenges to society and a highly profitable investment opportunity as well. However, investments like these are risky.

Another area we've looked at is related to the S and G components of the ESG space; we've started to measure corporate culture. According to a paper by economist Luigi Zingales, there are five pillars of corporate culture: innovation, integrity, quality, respect, and teamwork (Guiso et al. 2015). We use text-mining techniques—deep-learning techniques—on broker-dealer reports, the 10,000 reports that the Financial Industry Regulatory Authority receives per year. And we create a dictionary of words that appear in these five pillars. We count the frequency of these words in all the broker-dealer reports, adjusting for word length, document length, and other things. With this method, we come up with a quantitative score for what's usually a qualitative concept.

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This is a nonfinancial version of quality. Traditional quality metrics have all been based on balance sheets or earnings statements. Now we can augment those metrics with non-financial versions of quality. To me, this is the most exciting area in which you can use ESG data, but you build it into the factor definitions.

**Ludwig Chincarini:** I have two related questions. First, with the growth in quantitative investing, what separates quant manager A from quant manager B? What are the ways in which, for example, AQR Capital Management and other firms separate from you guys? How do you convince clients of those differences? Or is there a lot of similarity? Second, what do you consider the most innovative change in quantitative investing in the past five years?

**Andrew Ang:** What separates quant manager A from quant manager B? Factors are certainly quantitative. They are based on fundamental economic concepts, but implemented with quantitative and therefore scalable techniques. I like to think about a recipe. (Not that I'm a good chef; I can cook toast but not much else.) If you're running a restaurant, three things matter. First, you need a recipe. Next, you need access to ingredients. Then you need an actual chef.

The recipe is analogous to academic research, in which you might have tens of thousands of papers on factor investing, plus the research you might have conducted as a firm. A recipe is a quantitative way of creating a dish, and different types of factor research will result in different recipes.

But the recipe alone is not enough; that's essentially like a paper model. You also have to have access to ingredients, and those are your trading systems—how efficient those systems are, whether you can take into account transaction costs, and so on. Do you have experience in accessing different types of investment vehicles such as ETFs? You can certainly have a recipe, but if you don't go to the market and buy fresh ingredients, you're not going to produce a delicious dish.

Finally, even if you understand the recipe and have access to the ingredients, the chef matters. You still need to do due diligence to determine the portfolio manager's reputation. You need to look the portfolio manager in the eye. Maybe this analogy provides a framework for thinking about how to judge different quant managers.

What's been the most innovative aspect of factor investing over the past five years? To me, it's pushing out the concept of factors to a total portfolio, including illiquid assets. It's pushing out the factors to fixed income and beyond, to thinking about economic growth, real rates, inflation, and other macro factors—style, value, quality—in real estate, private equity, infrastructure, and alternatives. At this point, we can think about factors, not just asset allocation, for the entire portfolio. If we don't do this, sometimes we might double-count exposures in growth, say, in public equities and private equities.

Including factors in portfolio design gives us a good way to get more capital efficiency and to take advantage of institutional portfolios over the long-term horizon. With this approach, it's not a question of whether to buy public equity or private equity; the answer is both. You get economic growth in both types of investments, and you determine the right combination. You can get real rate and inflation exposure in public fixed income assets but also in real estate and in other more illiquid forms of debt.

This strategy is empowering because you can include all of the factors in the best possible combinations. You might even change the allocations slightly from a strategic setting over time.

**Ludwig Chincarini:** In relation to your analogy of a recipe, its ingredients, and a chef, there's a perception—maybe not among sophisticated investors but certainly among less sophisticated investors—that a lot of the value added right now is coming from what you described earlier as a tech surge. You're now

able to use high-powered machine learning and other technological advancements to gather data that is hard to collect.

In fact, your colleague Ken Kroner,<sup>4</sup> who's gone now, met me a few years ago here in San Francisco and said that you guys scraped data from every part of the world—from the internet, from every available source. So if you did a principal component analysis on your recipe, your ingredients, and your chef, what percentage of the return would you say is contributed by the ingredients or the ability to scrape this special data?

**Andrew Ang:** All of these components are important. Let me give you an example. Fixed income factors are still quite small. They've been growing, but the fixed income market is not like equities. With equities, even you and I can trade at or within the bid-ask spread, just like institutions. But because there's no centralized market for fixed income investments, people pay different prices. It's just hard to get data on factors in fixed income, plus there's less academic research in this area.

In the fixed income space, you might not be able to create a recipe because you might not be able to access the data you need. Firms that are able to hire talented people and get that data can build a model, but there's no guarantee they can execute it efficiently. Actually, this is a great example of how a lot of the value added comes from being able to trade, and people have different abilities at trading fixed income.

Finally, in relation to the chef, portfolio managers have different histories of trading fixed income investments. Some have worked in fixed income markets for decades, and some have entered these markets more recently. Again, all three components are absolutely important.

I think factors have always been at the forefront of innovative techniques. Big data is just the latest incarnation. If we look at the 1930s, when Benjamin Graham and David Dodd wrote the first treatise on factor investing in 1934, there was only balance sheet information. Remember, at that time, there were no codified accounting standards. Just being able to analyze balance sheet and earnings information rigorously and systematically was revolutionary.

More recently, the first movement to big data occurred in the 1980s, when we weren't able to store all of the accounting data and other data on 3.5-inch disk drives or the earlier 5.25-inch drives. We had to use sophisticated storage systems. That was the beginning. The natural evolution of data availability means that today we're using the robust statistical techniques that Mark Anson asked about earlier. We're using data sources like ESG information and other types of alternative datasets like text. We've always used factors to build on an economic

foundation, but now we can implement their use with the best research possible.

**Inna Okounkova:** Finally, we would like to hear your views on major trends in the investment industry and what the future holds. Most important for our readers is the role of the advisor and investment consultant.

**Andrew Ang:** Factors are here to stay, and they're only going to become more significant. In five to ten years, I want factors to permeate everything. If you sit down opposite a financial advisor and say, "I'm worried about losing my job, and I want my portfolio to have resilience," you're making a statement about factors, about defensive factors like quality and minimum volatility or defensive macro factors like real rates and inflation. If you sit down with that financial advisor and say, "I would like to save for my children's college education," you're making a statement about return-enhancing factors like momentum and value. In addition, factors will permeate financial advising software systems. As we create portfolios at scale and customize them, everything is going to be in a factor language.

For large institutional portfolios, it will be necessary that our portfolios include these different components. Currently, these components are often siloed, like public or private markets, index funds or factors, or alpha-seeking funds. We need all of these components to have consistency and to formulate the best portfolios, and factors are the language to help us accomplish that. I think the trend of factor investing is going to be absolutely mainstream. It's going to be the foundation of how we approach all aspects of investment in five to ten years. ●

## ENDNOTES

1. Charles Hallac was chief operating officer for BlackRock from 2009 to 2014. A co-founder of BlackRock Solutions, he previously served as head of that business. He was the initial architect of Aladdin® and many of BlackRock's operating processes and continued to be involved in the evolution of Aladdin and in improving BlackRock's technology and operations.
2. Laurence D. Fink is founder, chairman, and chief executive officer of BlackRock, Inc. He and seven partners founded BlackRock in 1988, and under his leadership, the firm has grown into a global leader in investment and technology solutions.
3. Eugene F. Fama, 2013 Nobel Laureate in Economic Sciences, is widely recognized as the "father of modern finance." His research is well known in both the academic and investment communities. He is strongly identified with research on markets, particularly the efficient markets hypothesis. He focuses much of his research on the relation between risk and expected return and its implications for portfolio management. His work has transformed the way finance is viewed and conducted. Kenneth R. French is the Roth Family Distinguished Professor of Finance at the Tuck School of Business at Dartmouth College. He is an expert on the behavior of security prices and investment strategies. He and co-author Eugene F. Fama are well known for their research into the effect of value and the three-factor model.
4. Ken Kroner was senior managing director and global head of multi-asset strategies at BlackRock from 1994-2016.

## REFERENCES

- Ang, A., and J. Liu. 2007. Risk, Return, and Dividends. *Journal of Financial Economics* 85, no. 1 (July): 1-38.
- Ang, A., and M. Piazzesi. 2003. A No-Arbitrage Vector-Autoregression of Term Structure Dynamics with Macroeconomic and Latent Variables. *Journal of Monetary Economics* 50, no. 4: 745-787.
- Ang, A., R. J. Hodrick, Y. Xing, and X. Zhang. 2006. The Cross-Section of Volatility and Expected Returns. *Journal of Finance* 61, no. 1: 259-299.
- Chan, Y., K. Hogan, K. Schwaiger, and A. Ang. 2020. ESG in Factors. *Journal of Impact and ESG Investing* 1, no. 1 (fall): 26-45.
- Feng, G., S. Giglio, and D. Xiu. 2020. Taming the Factor Zoo: A Test of New Factors. *Journal of Finance* 75, no. 3 (June): 1,327-1,370.
- Graham, B., and D. Dodd. 1934. *Security Analysis: Principles and Techniques*. New York: McGraw-Hill Companies.
- Guiso, L., P. Sapienza, and L. Zingales. 2015. The Value of Corporate Culture. *Journal of Financial Economics* 117, no. 1 (July): 60-76.



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