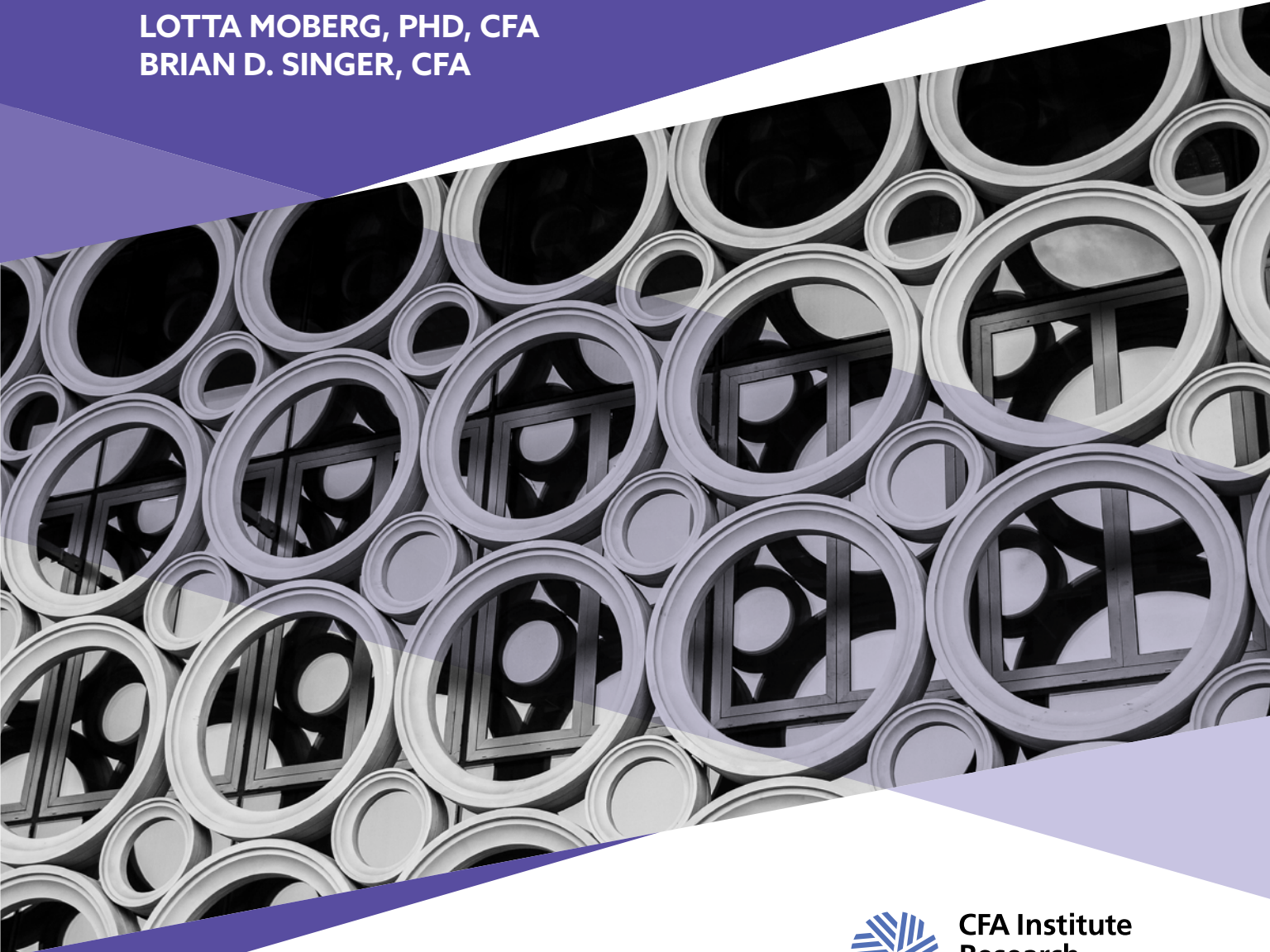


CFA INSTITUTE RESEARCH FOUNDATION / BRIEF

FINANCIAL ENTREPRENEURSHIP

BALANCING ACTIVE AND PASSIVE INVESTMENT HORIZONS

LOTTA MOBERG, PHD, CFA
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FINANCIAL ENTREPRENEURSHIP: BALANCING ACTIVE AND PASSIVE INVESTMENT HORIZONS

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It is better for reputation to fail conventionally than to succeed unconventionally.
—John Maynard Keynes (1936)

It is better to be vaguely right than exactly wrong.
—Carveth Read (1898) (commonly misattributed to J. M. Keynes)

Are investors more like sprinters or marathon runners? This research brief addresses this question and explores how the choice of a time horizon sets the pace of the investment “race,” while entrepreneurship fuels the strategy. In this race, some investors sprint to uncover temporary market inefficiencies. Other investors are in for the long haul, drafting behind the wisdom of the crowd. And, as in the world of running, each racer can be a winner in his or her own course.

Investors inhabit a variety of different conceptual worlds. The most important distinction is whether they view the world as being in equilibrium. A world in perfect equilibrium offers no opportunities for alpha and rewards only those investors with long time horizons who buy and hold for life. The extreme opposite of this view is that of a world of completely inefficient markets, in which price is unrelated to value. Such a world rewards the short-term trader who understands daily sentiments and can benefit from short-term momentum and price reversions. In between these views, we find dynamic investors who believe markets to be inefficient but constantly converging toward equilibrium. Such investors have medium-term horizons and adjust their portfolios with the appropriate medium frequency.

Investors need to determine how and where along this spectrum they should apply their talents. Investing with all eyes on equilibrium requires a different set of skills and personality types than navigating jagged daily market turbulence.

Determining one’s time horizon and basic portfolio design boils down to how entrepreneurial an investor chooses to be. No investor, or anyone participating in an economy, can avoid taking some action, whether intentionally or not. However, one can be more or less entrepreneurial by making decisions and taking risks more or less frequently, as well as by taking greater or lesser risks at those decision points. Thus, the choice of a time horizon is one of the most critical decisions an investor makes.

Entrepreneurship is the fundamental driver of progress. In the real economy, we think of entrepreneurship as the activity that brings together the other factors of production, usually identified as labor, capital, and land, in a way that creates value that did not exist before. When successful, entrepreneurship thus generates wealth, drives market returns, and creates opportunities. It is also a source of uncertainty that prevents our world from ever attaining a general equilibrium state. To understand entrepreneurship is to understand the drivers of growth and the opportunities that stem from it and to appreciate the uncertainties of the road ahead.

In this section, we will dive deeply into the nature of entrepreneurship to explain why *active investors are the entrepreneurs of finance*, what being an active investor means, how entrepreneurship in the economy affects investment returns, how to determine an investor's appropriate degree of entrepreneurship, and how to incorporate entrepreneurship into an investment framework.

Entrepreneurship, Innovation, and Invention

The word "entrepreneur" typically brings to mind someone starting a company. This stereotype is mostly correct but does not account for the full scope of entrepreneurship, which exists in many variations. A thread common to these varied perspectives is, as the economist Richard Cantillon suggested in the early 1700s, an active decision to take risk by bringing something to the marketplace. We will build on this concept of entrepreneurship to specify a precise definition of the word for both economics and finance.

To explain entrepreneurship, we need an understanding of "invention" and "innovation," terms that are often conflated with entrepreneurship and confused with one another. Invention refers to the creation of something completely new, such as a new gadget or a new management process. Innovation, meanwhile, is the adaptation of an invention to new uses and might also involve improvement in the efficiency or usefulness of existing technologies. Ships, for example, were historically built while moving them downstream, allowing people to stay in one place while contributing to the process. Later, the innovation of applying this technique to make assembly lines revolutionized the production of cars. Other examples of innovation include putting an electric motor in the shell of a combustion-engine car or offering food delivery as an independent service.

In truth, the line between invention and innovation is blurry. A car with an electric motor is, after all, a completely different machine from a regular car and could thus be on the invention side of the line. On the other hand, one could argue that finding pure inventions is difficult, because any material in a new gadget has already been discovered or created, so that most new devices constitute applications of existing inventions. Yet having a conceptual distinction between innovation and invention remains useful.

By "entrepreneurship," economists mean the act of bringing something to market, a step that follows invention and innovation. This something might be a new gadget or service, or a change in the way something is done that can potentially generate a profit. For example, family members might cut each other's hair. An entrepreneur then comes up with the idea of centralizing the practice in a barber shop. The entrepreneurial process involves inventors, innovators, and entrepreneurs, with the last bearing the risk of profit and loss, because she is the one to make the business decisions of what to bring to the market and how.

The distinction among entrepreneurship, innovation, and invention refers to the actions and not to the people performing them. Often, an entrepreneur is also the innovator or inventor, which is why people easily confuse entrepreneurship with innovation and invention. Take the example of the cofounders of Apple Inc. They took an existing invention, the mainframe computer, and innovated to change it to produce the first personal computer, which needed only the addition of a screen and a keyboard, thereby making the ownership and use of a computer accessible to anyone. This was the innovation, while bringing the personal computer to the mass market constituted entrepreneurship at a time when most users were electronic-kit hobbyists.

The Wisdom Hierarchy of Financial Entrepreneurship

In finance, the entrepreneurial role is played by active investors who either create new opportunities or exploit existing ones in new ways. Entrepreneurs bring novelty to markets by providing goods and services. Similarly, active investors bring novel capital weightings to financial markets through their capital allocation decisions. In economics, different stages along the path of bringing something to market are executed by the inventor, innovator, and entrepreneur. Similarly, in finance, there is the inventor of investment models or frameworks; the innovator, who is the model user, often with the title “analyst”; and the entrepreneur, often with the title “portfolio manager.”

The title portfolio manager is commonly given to the person acting as an entrepreneur at an investment shop. This is the person who has the ultimate decision-making authority, stands in the spotlight, interacts with clients, and brings products to market,¹ which in this case are portfolios to end-user investors in financial markets. Like other entrepreneurs, portfolio managers need to have deep knowledge not only to make decisions about how much risk to incur but also about the competition and client preferences. The innovator in an investment shop, the analyst, is the person who applies existing models and narratives to data in novel ways to provide distinct and actionable conclusions. Finally, the inventor of models and frameworks is an original thinker who can devise novel constructs for market analysis. Both innovators and inventors are often referred to as “analysts,” despite these fundamentally different roles. The title “analyst” often signifies an important person in the investment process who does not have final decision-making power.

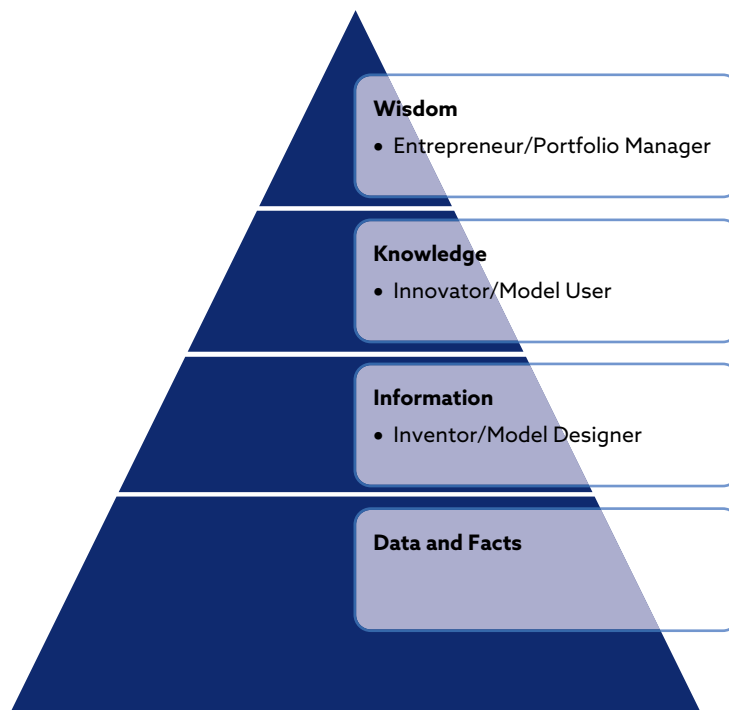
To understand the roles of the portfolio manager, the innovating model user, and the model and framework inventor, respectively, we apply the wisdom hierarchy as articulated by Ackoff (1989) and further described by Wallace (2007). This decision process hierarchy runs from facts and data to wisdom.

Appearing at the bottom of the hierarchy shown in **Exhibit 1**, facts and data exist externally in the world, but without a way to process them, they make little sense, because they are extraneous to the decision at hand. A big, unstructured database can be just as incomprehensible as

¹We call the individuals in the investment shop who make the active investment decisions “portfolio managers,” irrespective of their actual job titles. Many firms will have salespeople and traders. Salespeople physically bring products to market, and traders create and maintain portfolios by buying and selling assets, but they all function under the direction of the portfolio manager.

.....

Exhibit 1. The Wisdom Hierarchy



Source: Authors' interpretation of Ackoff (1989) and Wallace (2007).

a wall of hieroglyphics before the discovery of the Rosetta Stone. Only relevant data and facts advantageously organized provide useful information to the model user. For example, the price of blue agave in the Beijing markets has no relevance to a Palau-based technology sector analyst for whom it is just *data*. It is, however, relevant *information* to a Chinese farmer deciding what crops to bring to market on any given day. *Knowledge* arises when information is organized into sensible and useful narratives, or models. For example, the Beijing farmer might use factors such as the blue agave price, truck availability for transportation, and the weather forecast to garner knowledge about what crops to bring to which markets. Selecting the knowledge applicable to a task at hand is *wisdom*. For example, because our farmer has limited time that day, her wisdom leads her to reject models that include more distant markets.

The wisdom hierarchy maps onto the stages of entrepreneurship. First, the inventor of financial models and frameworks decides what data and facts to include in models and hence determines what constitutes information. Next, the innovating analyst uses the models to create knowledge from all the information. Last, the entrepreneur, or portfolio manager, uses that knowledge to provide wisdom.

Let us look closer at these roles, from the inventor to the entrepreneur, for a deeper understanding of how they apply in finance. The closest things to inventions in finance are original

models and frameworks. Markowitz's (1952) optimization approach, which identifies the efficient frontier of risky investments and underpins modern portfolio theory, is an example of a financial invention. Models and frameworks do not need to be complicated or mathematical, and they can come in the form of heuristic mental models as well as precise quantitative models. A model or framework could be something as simple as buying stocks of firms whose names begin with the letter *I* (this strategy captured all the "Internationals" in the 1960s) or buying whatever stocks Reddit users favor on a certain day and then selling them three days later. Models and frameworks consider all available data and facts and determine what among them is information.

Financial Invention and Innovation

The key to creating information is the rejection of data and facts that are irrelevant to potentially useful models. As Kurzweil (1999, p. 78) notes, intelligence means selecting relevant information carefully so as to destroy the rest. Similarly, information consists of data and facts filtered to have meaning according to the task at hand. A map, for instance, is meant to preserve only information about a landscape. It deletes most of the facts about what is on the ground and maintains only relevant facts, such as elevation, roads, and waterways, to convey information that is useful about the terrain. For example, digital mapping apps typically give users the option of choosing to display traffic, terrain, or other features. Each of these options plots different information by eliminating extraneous facts. Similarly, an inventor of models and frameworks must choose from a sea of noisy data and facts what pieces constitute information that is applicable to a model.

In the world of active investing, the inventor of models and frameworks might be an analyst working with the portfolio manager, an academic, or another type of thinker. As in the economy at large, the inventor often has no part in the business decision of whether to take the invention to market. Many inventions, such as the stochastic differential equation used in such areas as Einstein's work in physics, were produced by inventors who did not create innovative applications. The stochastic differential equation later became a core part of the Black-Scholes option pricing model, an innovation that was ultimately brought to financial markets (Joyner 2016). The inventor might or might not have a connection to or understanding of the world of business and could just be trying to impress his inventor peers or earn a degree.

The history of the humble solar cell offers examples of inventions created purely for the aim of inventing rather than bringing a product to market. In 1839, Edmond Becquerel, a 19-year-old French physicist, observed the photovoltaic effect, the ability to generate electricity from sunlight. Becquerel invented a device that created an electrical current by immersing two plates of gold or platinum in a conducting solution and exposing them in an uneven way to sunlight to produce voltage. The French mathematician Augustin Mouchot perceived an entrepreneurial opportunity for putting this invention to use and innovated a solar-powered printing press, which he revealed at the 1878 Universal Exposition in Paris. Mouchot's funding ended, however, and the research halted. In another course of events, the German physicist Heinrich Hertz discovered the photoelectric effect, which occurs when light falls on certain materials, thereby releasing electrons, which can be harnessed for electricity. The first solar cell based on the photoelectric effect was subsequently *invented* by the Russian scientist Aleksandr Stoletov. Today, numerous entrepreneurs have exploited Stoletov's invention by *innovating* solar cells that use

the photoelectric effect to convert sunlight into power.² While all these creations are derivatives of Stoletov's *invention*, they were massively improved through *innovation*.

Many financial models are invented and published by academics trying to earn tenure in their department, without considering whether or how their new model or framework could be implemented to make money. This allows investors to innovate by applying these invented models and frameworks to information emerging from new situations. Applying a model to the appropriate information creates knowledge, such as the insight that the UK stock market might decline after the British people voted to leave the European Union.

Of course, the same person often both conceives and applies models. Consider how an equity market analyst sorts through data, creating pieces of information that include historically low market volatility and low interest rates. Designing some graphs to look at correlations between the two, the analyst invents a model, the "volatility-rates correlation model," which, while not particularly original, does constitute a model. The act of deciding which model to use necessitates that the analyst extract information from among all the data and facts. Much analysis consists of reasoning through brisk news flow or multiple reports from a company. In determining whether a company is doing well enough to justify a long position, the analyst might apply an intuitive model for which she must select the data and facts that constitute the information relevant to her mental model. This information, in turn, can help create knowledge when interpreted through models and frameworks, which might be as nontechnical as a simple heuristic or a list of the pros and cons of keeping the position. This knowledge creation is then followed by a decision based on those reasons for and against, or simply on a gut feeling.

Financial Wisdom

The final and highest step of this hierarchy is wisdom, which represents a deeper understanding drawn from the experience of prior successes and failures. Wisdom informs what pieces of knowledge are relevant, depending on whether the applied models are appropriate, and it informs what to do with the knowledge at hand. Wisdom often emerges over time from the aggregation of different pieces of knowledge. It cannot be described in words and cannot therefore be transferred to other people. As such, wisdom is often expressed as intuition—that is, a deeper understanding of how pieces of knowledge fit together whose origin is impossible to explicitly derive.

Wisdom is the purview of the portfolio managers, who act as the entrepreneurs of finance, whether as an asset adviser or executive of an asset owner such as a pension fund. Portfolio managers use their wisdom to understand opportunities and challenges. They incur risks by making the final decisions to distribute scarce capital. They also make judgments about the relevance and quality of analysis, taking a holistic perspective on the validity of information

²There is of course more to the story of solar cells and power. In 1883, American inventor Charles Fritts invented the first photovoltaic solar cell by coating selenium with a thin layer of gold, thereby achieving an energy conversion rate of 1%–2%. He also served as the innovator of the first solar panels, which he secured to his New York City rooftop. In addition, by the 1950s, inventors Daryl Chapin, Calvin Fuller, and Gerald Pearson at Bell Labs realized that semiconducting materials, such as silicon, were more efficient than selenium and created a solar cell that was 6% efficient. One could argue that this was the real invention of solar technology, because it was the first solar cell that could power an electric device for several hours. Commercialization came in 1955, when entrepreneurs at Western Electric licensed commercial solar cell technologies. As with Charles Fritts, the inventors at Bell Labs were not pure inventors, given that they presumably had a commercial purpose.

Exhibit 2. States between Invention and Entrepreneurship

	New Idea	Idea Application	Market Application
Economy	Inventor	Innovator	Entrepreneur
Finance	Model builder	Analyst	Portfolio manager
Level in hierarchy	Information	Knowledge	Wisdom

and the appropriate model application. While the model inventor chooses the data to apply in her models, and the analyst uses the models and information from this process and determines how to apply it in models, the portfolio manager is the final arbiter, just as an entrepreneur is the final decision maker regarding bringing any invention or innovation to market.

Wisdom allows for forward-looking thinking that is deduced from an understanding of what the knowledge amassed thus far implies about the future. Like entrepreneurs, who usually capture the limelight when a successful product comes to market, portfolio managers are seen as the active star, even though a firm's model builders and users perform crucial, behind-the-scenes roles in capital allocation.

Most investment entities will not divide tasks precisely among a designated model builder, analyst, and portfolio manager. A designated portfolio manager might do a lot of model building and analysis. In many smaller shops, a single person might gather information, build and use a model for analysis, and make decisions based on her acumen.

We can systematize the stages between invention and entrepreneurship as shown in **Exhibit 2**.

Two Types of Entrepreneurship

Before determining how much entrepreneurship an investor should undertake, we need to form a better understanding of what entrepreneurs do. Entrepreneurs come in two types: the discoverer and the introducer of novelty. The discovery process is called "Kirznerian entrepreneurship," after New York University economist Israel Kirzner. Introducing novelty is the more familiar "Schumpeterian entrepreneurship," described by economist Joseph Schumpeter from Austria.

Schumpeterian entrepreneurship is the commonly perceived image of the entrepreneur as a pioneer staking out a completely new path. Rather than breeding a faster horse and building a better buggy, Henry Ford saw beyond what people wanted and made something that people did not know they wanted. A hundred years later, people needed an entrepreneur in a black turtle-neck to understand that they wanted a phone with a beautiful touchscreen and a host of new capabilities. A conventionally held view is that entrepreneurs create new demand by coming up with new things and are not afraid to move fast and break things in the glorious quest for radical novelty and creative destruction. "Creative destruction" means introducing things to the market that *lower the demand for existing goods* and thereby decrease the value of those existing goods, toward which prices will follow.

Although most people think of all entrepreneurship as Schumpeterian, entrepreneurship is most often better described as a process of discovering and satisfying existing wants. This discovery process does not need to entail a disruptive invention or innovation of new products. It simply refers to the discovery of existing opportunities, as opposed to the creation of new preferences and technologies. This Kirznerian entrepreneurship, achieved through the discovery of wants and opportunities, was described by von Mises ([1949] 2008) and explored further by Kirzner (1973).

Kirznerian entrepreneurship is an equilibrating force that discovers and exploits opportunities by closing the gaps between the current prices of goods and their actual values. Something might be overpriced by not being sufficiently accessible to people or underpriced by not being offered in a preferred format. Entrepreneurship through discovery means identifying discrepancies between current market supply and people's preferences. For example, although people drink alcohol, they might prefer a cannabis-infused cocktail alternative that does not damage their liver. If the technology exists to produce this cocktail affordably, the opportunity arises to bring it to market. This type of entrepreneurship can also be as simple as discovering suburban demand for a product that is sold only in the city and employing an existing cost-effective way of distributing it to the new market.

If no underlying economic fundamentals changed and entrepreneurs were allowed to exploit all opportunities for entrepreneurship, markets would eventually reach an equilibrium at which no more opportunities or uncertainties would exist. We would experience this state of the world if entrepreneurs were to exploit all current opportunities. But whenever preferences change, external circumstances evolve, or new technologies emerge, the underlying equilibrium changes. These changes generate a variety of gaps between values and prices that entrepreneurs can discover and exploit. Entrepreneurship helps move the system toward equilibrium by exploiting and thereby closing such gaps (Kirzner 1997, p. 62). This drives prices toward values.

Schumpeterian entrepreneurship, by contrast, widens the gaps, pushing values away from prices. As a result, every act of Schumpeterian entrepreneurship creates multiple opportunities for Kirznerian entrepreneurship. Because of the many different sources of such opportunities, including people's evolving tastes, changes in the weather, and new threats of terrorism, opportunities for Kirznerian entrepreneurship are more numerous than for Schumpeterian entrepreneurship.

Kirznerian and Schumpeterian Entrepreneurship in Financial Markets

The dominance of Kirznerian entrepreneurship relative to Schumpeterian entrepreneurship is even larger in financial markets. Whenever financial asset prices or values change, opportunities for Kirznerian entrepreneurship emerge that investors can exploit by closing the gaps between prices and values. These gaps might come from price changes as market participants erroneously lower or raise the price of a firm whose value has not changed. Or they could come from changes in fundamental values, as new technologies or changes in consumer preferences occur without market participants realizing it.

With sufficient time to exploit these divergences, it might seem that financial markets should eventually reach a state of equilibrium, at which all prices converge with fundamental values.

Yet new gaps between values and prices continually emerge because of changes emanating from the many interactions of the complex system. People's changing tastes, inventions, and innovations all open new doors for entrepreneurs, so that the system never reaches equilibrium (Kirzner 1997, p. 80).

While Kirznerian entrepreneurship dominates active investing, the world of finance also features an element of Schumpeterian investing. Schumpeterian investors pursue novelty and disruption through their investments, something that is possible mainly for earlier-stage firms. We therefore find Schumpeterian investors predominantly in the fields of private equity and private credit, including the earliest-stage angel investments.

Note that the distinction between Kirznerian and Schumpeterian entrepreneurs—that is, between entrepreneurs who seek and exploit existing opportunities and those who create new ones—is a conceptual distinction that refers to the *act* of entrepreneurship, not the person doing it. Entrepreneurs themselves might well engage in both types of activities.

Forecasting and Nowcasting

A helpful distinction between Schumpeterian and Kirznerian active investors lies in forecasting versus nowcasting. We can think of Schumpeterian investors as forecasting and Kirznerian investors as nowcasting. Forecasting means predicting what will happen in the future and is associated with investments that help bring this future about, by investing in new and disruptive technologies and the like. Nowcasting refers to real-time information processing using models designed to discover existing opportunities. To trade Walmart stock, for example, we might count the number of cars in a Walmart parking lot to estimate current demand.

For people with the ability to forecast future preferences and technologies, Schumpeterian investing can be highly rewarding. An investor with insight into the future of transportation, for example, might invest in air taxi companies before the vehicles are even on the market. For most investors, however, the opportunity is Kirznerian and lies in seeing and interpreting what is happening today.

The forecasting-versus-nowcasting distinction provides a clearer picture of what we mean by Schumpeterian and Kirznerian entrepreneurship in finance, yet conflating the two is admittedly easy when just looking at someone's actions. A Kirznerian entrepreneur who discovers an existing opportunity will have a view of how prices and opportunities will evolve and will take action today, which might come across as bold and forward-looking (Kirzner 1999, p. 13). Therefore, nowcasting current values leads to a forecast of future price changes. The opportunity gaps are revealed only when they are exploited.³

Now that we have a conceptual understanding of sources of entrepreneurship in finance, we will hone our understanding of capital allocation as an activity that creates wealth, rather than merely redistributing it.

³Does a gap between price and value exist before anyone discovers it? If no one opens the box with the gap inside (a concept dubbed "Schrödinger's Gap™"), is it ever there? Does the gap know when it is being observed? Please send your answers to lottamob@gmail.com and briandsinger@gmail.com to win the Kirznerian Quantum Prize.

Active Investing as Entrepreneurship

Many readers might find that referring to investors as entrepreneurs is nonintuitive. Investors are not seen as making things. Rather than bringing goods to markets, they merely allocate capital to the actual entrepreneurs, who the investors believe will do so profitably. This notion stems from the classical divide in economics between capitalists and workers, as found in the writings of Karl Marx and others. In this view, only workers are seen as producing, while capitalists, who do not touch goods with their own hands, are seen as living off windfall rents. Yet by now, many people also recognize that capitalists take on much of the production risk. We argue that capitalists in the form of active investors are indeed creators who help bring novelties to the market, rather than merely moving capital to one project at the expense of another.

Tom Wolfe's *The Bonfire of the Vanities* offers a fun and derogatory characterization of the perception many people have of capital allocators. In the book, a child asks her mother what her father does as a bond broker, and her mother replies, "Just imagine that a bond is a slice of cake, and you didn't bake the cake, but every time you hand somebody a slice of the cake a tiny little bit comes off, like a little crumb, and you can keep that!" (Wolfe [1987] 2002, p. 260). Like the broker in Wolfe's novel, investors are typically advisers or agents who move money from one hand to another based on supply and demand, thereby allocating assets into the hands where they are most valued. That this activity is merely about picking up crumbs along the way is the view that many laypeople share with respect to the arcane world of investing and capital allocation.

This line of thinking typifies the misunderstanding about capitalists and investors as being unproductive. Most people think about investors' activity as merely one of allocation, rather than creation. Perceiving the allocation of capital as a fundamentally nonproductive activity derives from some simple, stylized models in economics, such as the story of Robinson Crusoe, who in the classic novel by Daniel Defoe winds up alone on an island. With the few resources he has, he must allocate his consumption across time, thereby engaging in resource allocation, which many see as the basic goal of economics. However, as Simon (1989) argues, even Crusoe in his seemingly allocative state of circumstances uses his energy mainly in creation and innovation. He builds shelter for himself and constructs a small boat to explore the island. While he must, for some amount of time, divide his use of corn seeds between eating and planting, his main investment is in learning the new skills of farming and breeding the island's wild goats. Only two pages of the novel cover the optional uses of corn seeds, and one discusses their abundance (see Defoe [1719] 1963, pp. 88, 113, 133). Beyond that activity, Crusoe's adventure is dominated by exploring and innovating.

Most human action involves some degree of creation. Only after obtaining all the wine, stimulants, and groceries we want to consume do we need to distribute them across time. Just like Robinson Crusoe, we get on with life mainly through creation, as opposed to allocation. Investment similarly is not just about the allocation of existing capital. It is about understanding what the capital will do to yield the highest output.

Investors earn what is referred to as "alpha," meaning a return above the average of the market, by using their judgment to take positions different from those of the average investor. Investors change the course of history by supporting some companies at the expense of others, thereby helping some to grow while other companies risk stagnation. Conversely, "beta" is earned by following the lead of the average investor. Both activities consist of backing one company at

the expense of another, with the one difference being that the “alpha” investor leads while the “beta” follows. Together, they direct resources to the most promising companies, changing the course of history by determining what products and services ultimately come to market.

Like a business owner who allocates a firm’s resources to make it more profitable, an investor creates value by making decisions about the allocation of resources. The decisions generate higher output, increasing wealth in an inherently creative process. Neither the business owner nor the investor is making anything with their hands, but as they spend time making decisions about the allocation of capital, labor, people’s time, and lines of production, they both engage in creation rather than allocation.

On the Spectrum Between Active and Passive

What is generally referred to as passive investing represents an increasingly large share of the capital invested worldwide today. Nevertheless, we have so far focused on active investors to help our readers discern where they fall along the spectrum of active to passive. Passive investing, not just active management, benefits investors, because it allows people without financial skills to participate in market growth. Similarly, people in the labor force who do not possess entrepreneurial interest or skills benefit from working under the safety of someone else’s firm, rather than starting their own. In a world constantly moving toward equilibrium but never reaching it, passive investors automatically and persistently benefit from the increase in prosperity that entrepreneurs generate. An index-following strategy works precisely because not everyone follows it.

Entrepreneurial investors who exploit opportunity gaps are generally seen as active investors. Passive investors, by contrast, set portfolio allocations for the longer term without any dynamic adjustments in response to value-price opportunities, allowing their holding sizes to change only because of changes in firms’ stock prices and the number of shares outstanding. We sometimes refer to active and passive investing as though they are opposites or dichotomous, but all investors fall along a spectrum from active to passive and from short- to long-term investing. No one investor can ever be purely passive or purely active. How active an investor is, however, boils down to how short the time horizon is for which decisions are taken.

No Investor Is Completely Passive

Regardless of an investor’s desire to be passive, investment decisions must at some point be made, regardless of time horizon. The timing and nature of this allocation is an active choice. To see the impossibility of purely passive investing, consider what being a passive participant means in the real economy. To ride on the growth of the economy, you want to be a worker who does not take on any personal risks but merely floats with the economic tides. This implies seeking out a broad, diversified exposure to all components of growth in the economy while also avoiding any local risks. Alas, this is not possible, because even the most timid worker must make an active decision about where to invest her human capital. The very act of choosing what firm or public institution to work for and when to begin inevitably involves concentrated risk. As a result, the timid worker in pursuit of a passive life must define the universe as the organization where she works, within which she can then take the minimum amount of risk possible. We might call this worker passive, but most people would recognize that choosing a firm for life, were such a thing possible, requires making an important decision with a long-term horizon.

Once inside the firm, the worker could lead a passive existence. Let us apply Sharpe's (1991) arithmetic of active investment management for a closer look at the situation. This arithmetic says that returns before investment costs will be, on average, the same for active and passive management. Because passive management is cheaper, net returns for passive are higher than for active after costs.

Extrapolating from investment markets to labor markets, imagine a firm that functions as a closed universe. As we will see, in such an operation, Sharpe's arithmetic might hold and would therefore suggest that any worker is best off leading a passive existence. Imagine that the firm does not hire new people, and no employee can ever leave. Let us say the firm has two kinds of employees, active risk takers and passive followers, and that compensation is based on contributions to the firm's earnings. The followers cannot advance and therefore see their compensation grow only with the growth of the firm as a whole. As a result, they benefit from the risk takers' initiatives to improve management styles and firm products. The active risk takers gain only when they succeed. Who will come out on top?

If the world's system is as closed as that of the firm, its risk takers will be granted the same average compensation as the followers, who take no initiative. If the only way you can advance is by climbing the corporate ladder within a firm, one person's gain is another's loss, and many risk takers will achieve below-average success and end up at the bottom. If the firm grows, the boss who determines compensation will need to demote the workers costing the firm money for their risky mistakes so that she can promote the successful risk takers. Such a zero-sum compensation scheme is necessary for the passive workers to maintain their positions. As a result, any gain for a passive worker would be the same as for the average risk-taking worker.

Of course, in real life, the universe is not fixed. People get ahead by taking risks, being promoted, and moving to new positions at other firms. While some risk takers do fail, the majority gain from taking risks, and their success is not at the expense of all the other people trying to contribute to the firm's success. Intuitively, an economy's entrepreneurs benefit from their initiatives, on average, but because they sometimes fail, this benefit comes with higher risks. This is because the world of entrepreneurs is dynamic, with opportunities to start and move between firms in search of opportunities.

This is how the economic system works, and it is how markets work. As Pedersen (2018) explains, once you allow for active investors buying and selling shares of firms that move in and out of indices, Sharpe's arithmetic no longer holds. Active investors can make money by buying shares of companies they think might enter an index and selling them before the companies drop out. Also, as long as an index changes constituents, passive investors must buy and sell shares of companies that enter and leave the index, which allows active investors to sell at premia and buy at discounts.

Why Active Investing Is Not a Zero-Sum Game

Our firm analogy leads to an even stronger case for why the system is not the zero-sum game of Sharpe's arithmetic. The model of a closed firm is unrealistic, because it assumes that people would be willing to advance ideas to benefit the firm, even if their expected net benefit from any such initiative would be zero. More likely, we would not see anyone in such a firm willing to take any risks. All the firm's employees would be better off with low-volatility, passive compensation and no risk of immediate ruin. Without any incentives for improvements, the firm would likely

see no growth, and worker compensation would be a zero-sum game. In the long run, the firm would likely wither away, making the organization a negative-sum game.

That such a closed system would implode from stagnation is an economic inevitability. Without the infusion of new energy into the systems constituting an economy, entropy would increase, resulting in stagnation and wealth destruction. This is the dynamic that resulted from the COVID-19 lockdowns in 2020–2021, as governments incentivized firms not to fire workers and the lockdowns discouraged them from hiring new ones.

It might seem as though a system like our isolated firm would be fine as long as capital was flowing into the company. But without incentives to allocate the capital in a profitable way, no entrepreneurship would take place, and as a result, no such capital would be forthcoming. This is like allowing new firms to enter and exit a stock index while keeping the investors' holdings unchanged. With no selection mechanism for capital allocation, and therefore no enhancement of productivity between firms, there would be no growth. In the case of the firm, workers mix their endowed human capital with circulating physical capital. In the case of the stock index, investors mix their endowed capital with firms' human and physical capital.

However, while a closed market is a physical possibility, in the absence of freedom for investors to move in and out of an index, no investor would want to be active. Sharpe's arithmetic would reign supreme and cause all to earn the same returns. Without any incentive for price discovery, capital would not be channeled from less to more productive firms, and the public market would see little or no growth.

Because we observe growth, we can conclude that the system is open. Also, if no one expected to benefit from taking initiative, as opposed to passively following the crowd, we would expect people to be as passive as possible. Because we still see active players, we can conclude that the system has freedom of movement. This also means that Sharpe's arithmetic never holds in open systems.

Understanding why Sharpe's arithmetic does not apply to markets at large requires one fundamental insight: Markets are not zero-sum games. A dollar gained by an active investor is not one lost by everybody else. A share that an active investor buys cheaply and sells expensively is not a loss to others. The active investor contributes to the discovery of the share's true value and thus to the value of the market at large.

This subtle value creation is similar to that in the economy as a whole. It might seem as though a firm that buys material cheaply and sells it dearly is merely robbing society of money by profiteering. In fact, the firm can sell its goods for more than it paid for them only by adding value to the goods, which sometimes just means putting them on a shelf or advertising them to people who might or might not know they want them. Similarly, in financial markets, a person who buys a stock and then sells it at a higher price contributes to the value discovery of a stock that was previously underappreciated. By adding to society's knowledge of what something is worth, the investor is rewarded with a profit. The investor who then buys the stock at a higher price is not a loser, because they bought something with a higher fundamental value.

How Passive Investors Gain Exposure

Thanks to active investors, passive-leaning investors can free-ride on markets that add value without making frequent decisions. This is a good thing, because it provides additional capital in the system from more investors who do not need to understand financial markets

to participate. The equivalent in the real economy is the passiveness of rank-and-file workers, who benefit from the fortunes of a company without having to know how to start a company.

Financial markets provide better opportunities for investors to be passive participants than economies do for workers to behave similarly. In financial markets, it is possible to cheaply and easily gain exposure to a large universe of securities that spans industries and countries.

In principle, investing in the entire world economy using financial instruments should be possible, but full exposure to the wealth of the world economy is a tall order. Oddly, it seems almost as though financial academics concluded that publicly traded securities are sufficient to represent the entirety of world wealth required by general equilibrium models, such as the CAPM. Roll (1977) made this critique decades ago. While some providers of market-capitalization-weighted indices claim to closely represent world wealth, global capital spans much more than publicly traded stocks and bonds, and the relatively small part of real estate that is publicly traded. Another part of global capital lies in any corner shop, for instance, without providing any way for investors to gain exposure to the shop.

Human Capital as a Component of World Wealth

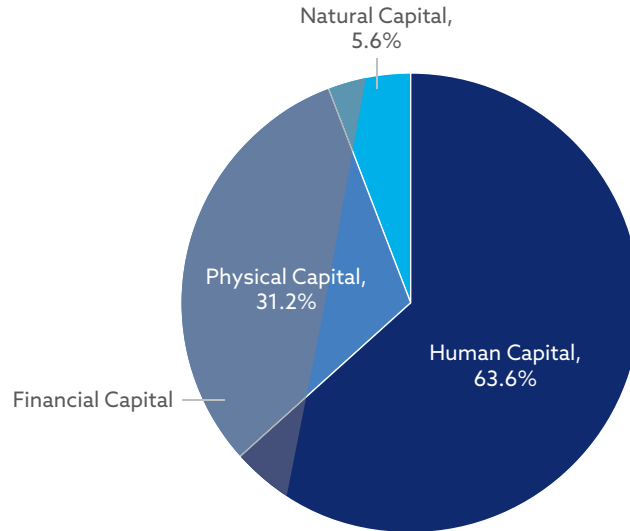
The most valuable component of global wealth, human capital, is largely uninvestable due to being inherently difficult to diversify. We all invest in our own human capital throughout our careers, but few opportunities exist to gain human capital exposure beyond one's household.

In 2005, the World Bank introduced a measure of countries' wealth underpinning world income, taking human capital into account. The 2021 edition of *The Changing Wealth of Nations* extends the data to 146 countries through 2018. The World Bank measures the present value of human capital by discounting the future stream of wage compensation of the people of each country, with applicable growth and discount rates (World Bank 2021). According to the World Bank, total world wealth, comprising physical, natural, and human capital, amounted to \$1,152 trillion. Human capital makes up nearly two-thirds of this amount. Yet finance quite naturally focuses on financial capital's access to physical, intellectual, and—to a more limited degree—natural capital, while broadly ignoring human capital, because human capital is so difficult to invest in. In measuring the market portfolio, human capital should be added for a more accurate result.⁴ Financial capital, shown as a shaded arc in **Exhibit 3**, includes approximately \$200 trillion of global public and private equity and credit.⁵ While some human capital exposure can be obtained by holding assets in public and private companies and real estate, human capital constitutes a missing piece that is needed to complete any financial market general equilibrium puzzle. As illustrated by the shaded area in the graph, financial capital covers only a part of the world's total wealth.

⁴Future research on the composition of global wealth and income might apply the methodology in Brinson, Diermeier, and Schlarbaum (1986) and include human capital as measured by the World Bank for a more valuable estimate of the compensation for risk.

⁵There is some lag in these numbers because the World Bank did its study in 2018, and the financial data reflect 2021 numbers. This exercise, however, is not aimed at accuracy, and the three years between the data sources saw both low growth and low inflation.

Exhibit 3. World Wealth in 2018



Source: SIFMA, McKinsey Global, World Bank, St. Louis FRED database.

The Challenge with Investing in Human Capital

The World Bank data suggest that human capital is the big piece of the economy that is missing when one invests in financial assets. Still, human capital has not been completely out of the sight of financial markets. There are some creative examples of people trying to make human capital more liquid and obtainable. In 2005, Andrew Fischer sold 30 days of advertising space on his forehead in the form of a temporary tattoo (Fischer 2017). An even more creative scheme was provided in 2008, when Mike Merrill of Portland, Oregon, sold shares of himself on the open market. By November 2021, more than 16,000 Mike shares were trading at \$6. Although initially, he used this as a way to crowdsource his business decisions, his shareholders soon directed more personal choices, such as his sleeping habits and whether he would undergo a vasectomy (Davis 2013). These examples illustrate that the market for human capital is inherently illiquid.⁶

More sober examples of traded human capital come from the world of so-called income share agreements. These are contracts offering returns on human capital, with the idea to transfer risk and return from the owner of the human capital, and thus the generator of income, to an investor, who pays up front for a share in someone's income stream. Various universities have income share agreements in the form of tuition grants in exchange for a share in the student's future income. A few attempts have been made to enable investors to fund income

⁶This brief is purely informational and does not constitute financial or investment advice. Always conduct your own research and consult with a licensed financial adviser before making any investment decisions. The views expressed in this brief are solely those of the authors and do not reflect the views of any affiliated entities or partners.

share agreements, thus exposing the investor to people's income streams, but few of these attempts have worked out (Ring and Oei 2015). Beyond these special situations, human capital is normally merely rented for periodic wages, and there has not been any sustained market for the present-value purchase or sale of human capital.

A less-hands-on way of encapsulating human capital into investments might be the total-economy approach by Garvey (2021). Focusing on the United States, this framework for portfolio construction modifies the sector weights in portfolios of listed equities to mimic the returns to labor, capital, and intermediate inputs of the less-traded components of the economy. While these portfolios are a solid proxy for the capital-labor ratio and low-, medium-, and high-skilled labor, they unfortunately do not separate out such factors as size or credit quality from the human capital exposure to make them a generally implementable vehicle for portfolio investment in human capital.

You Can Escape Neither Passivity nor Activity

Financial instruments provide a means for people to be broadly exposed to the economy, yet they fail to allow for completely passive participation. Nowhere do we have well-defined and confined economic and financial systems. In both the economy and financial markets, an isolated universe would probably stagnate but most likely, according to the second law of thermodynamics, contract. Because the firm or market an investor selects as his or her universe is always a choice, no one can be a completely passive player.

While portfolios with the longest time horizons might be considered passive, they inevitably contain elements of active investing, regardless of how long an investor plans to hold a broadly diversified portfolio. Because holding all of the world's assets would be impossible, there are indices to choose, asset class weights to determine, and rebalancing decisions to time, all of which confound any desire to be purely passive.

In the labor market, a worker might actively choose which firm to work for and, having landed a job, take fewer initiatives and risks than her colleagues. Staying passive does not mean standing still in a world moving forward. It means moving with the stream and mimicking the average of what others are doing. In finance, passive generally means broad market exposure but can really be any exposure an investor expects to hold for a very long time. Passive, in practice, translates to a longer time horizon.

While complete passivity is impossible, avoiding passivity altogether is also difficult. This is as true in the real economy as in finance. In the real economy, being a worker always comes with some degree of passivity through repetition and being beholden to supervisors. Directives allow workers to avoid initiative and, therefore, risk. Supervisors also face passivity through managerial repetition and the orders of their supervisors, up to the chief executive. As Frank Knight (1921) argues, even the chief executive inevitably transfers decision making and thus risk to the shareholders, who are the ultimate decision makers and risk takers of the organization. Thus, even the chief executive is, in principle, passive in being beholden to the approval of the firm's owners. Similarly, no investor can avoid all passivity. Most investors need to measure performance against some benchmark or other portfolio or have to consider, in some way, the information contained in price movements.

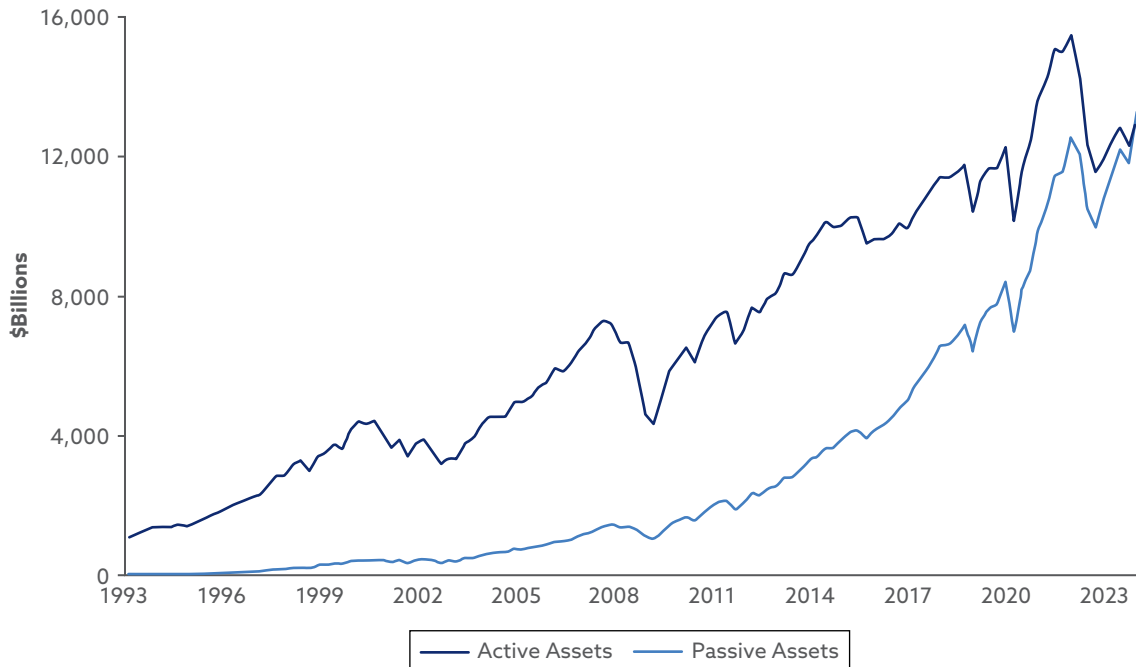
Passive and Active Both Have a Role

An economy needs passive workers as well as risk-taking entrepreneurs. Financial markets similarly need both shorter-horizon active and longer-horizon passive participants. Everyone has different risk preferences, and being active rather than passive is not better in absolute terms. Only a free market can reveal the ideal macro-shares of passive and active investing, and even then, the current market share can only move toward, not achieve, an optimum. With the popularity of exchange-traded funds, most of which are index funds, the share of passive has risen. **Exhibit 4** shows that both active and passive funds have grown over time, with passive catching up to active assets in 2023. The long-term share of passive investing is still in the process of revealing itself.

Passive investing has been likened to a drunk person who requires active investors to keep him on a straight path. If passive gets too big, the market is as doomed as a drunk man allowed to walk straight to his death (Cole 2018). With too much passive investing, there would be too few



Exhibit 4. Historical Fund Assets: Active versus Passive



Source: Morningstar Direct Asset Flows. Data as of 31 December 2023. © 2024 Morningstar, Inc. All Rights Reserved. Reproduced with permission.⁷

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investors and dollars involved in price discovery. Passive investing, however, plays a positive role in markets as well. The acts of mimicking others and doing what has proven to work support progress and are an essential part of growth. If we never took passive advantage of the novelties we invent, they would be of little use.

The trade-off between passivity and entrepreneurship can be generalized as the trade-off between exploitation and exploration. Exploitation means applying possessed knowledge and established ways of doing things with the assumption that current knowledge is correct or at least sufficiently useful. In financial markets, it means assuming that the market prices investors have generated through their price discovery process are correct so that the best one can do is invest along with everyone else in a buy-and-hold strategy. A passive investor is exploiting, thus free-riding on, the costly information gathering or price discovery performed by active investors. Exploration means finding new paths and new ways of doing things, and challenging current market prices. Most of the time, the established way of doing something is better than the experimental alternative, but without some experimentation, we will never know, and society would never move forward.

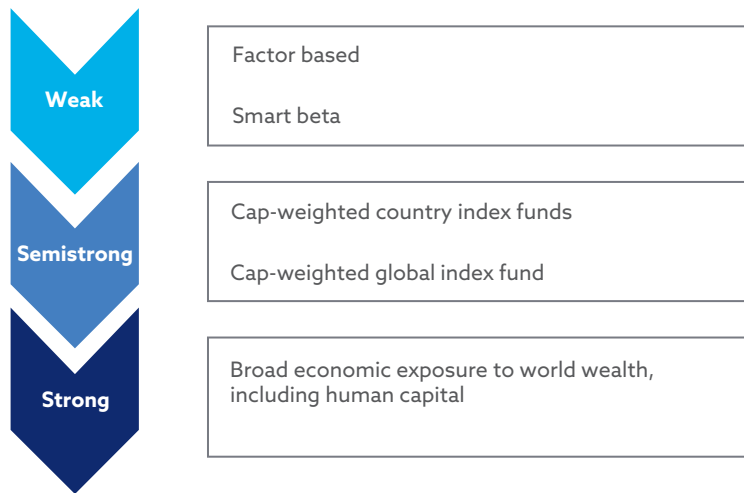
The trade-off between exploitation and exploration can be found in all facets of life, whether going to a casino, playing a video game, shopping for groceries, or picking trading strategies. This trade-off is a widely applied concept in reinforcement learning, in which an algorithm seeks the right balance between exploration and exploitation in pursuit of the highest payoff. In an economy, the trade-off between exploitation and exploration takes place between passivity and entrepreneurship, where passivity means using current knowledge to take on established types of work, while entrepreneurship means taking chances by trying new ways of amassing knowledge and going against conventional wisdom.

Through an iterative process, we all constantly improve our balance between exploiting and exploring, just as economies and financial markets constantly move toward the optimal ratio between passivity and entrepreneurship. Thanks to the ever-changing costs and payoffs of different strategies, this process never stagnates. Exploiters and explorers live together in symbiosis, because each needs the other. Passive investors naturally benefit from the price discovery that active investors provide. Active investors benefit from the existence of the passive investors, who provide liquidity to markets and capital to the firms that those active investors bet on as the winners of economic growth.

Levels of Passive Financial Exposure

The more passive an investment strategy, the longer its time horizon will be. Among the strategies commonly referred to as passive, some clearly have a bigger claim on the designation than others. We see these as ranging from strong to weak forms of passivity. The weakest form is strategies that are only nominally passive, such as smart beta strategies that rely on indices with weights tilted by different factors. Unlike short-term factor trading, smart beta is often fundamentally driven and longer term, as investment managers build indices with tilts that differ from those of purely market-cap-weighted indices and thus pursue persistent and systematic risk exposures (Singer 2018, p. 46). Smart beta resembles passive investing by maintaining stable exposures to certain factors, such as value, size, or momentum, but those factor exposures must be actively determined, with a shorter time horizon as a result.

Exhibit 5. Different Levels of Passive, with Weak Being the Least Passive, and Strong Being the Most Passive



Semistrong passivity is what most people refer to as passive strategies. This often involves holding equity and fixed-income indices in which the weights are proportional to their market capitalizations. Such a strategy might be home biased, in which case, people in the United States overweight country indices such as the Standard & Poor's 500 Index and the Bloomberg US Aggregate Bond Index. A similar but broader exposure can be obtained through international indices, such as the MSCI All Country World Index (ACWI) for equities and the Bloomberg US Aggregate Bond Index for bonds. Exposure to these indices can easily stretch over decades.

The strong form of passive investing constitutes a true passive position and involves broad economic exposure to global wealth through private as well as public markets, real estate, the corner shop around the corner, and human capital. Because this passivity would require exposure to markets that are not yet developed, such as a functional market in human capital, it is for now only a hypothetical concept.

On the broad spectrum between passive and active strategies, we can never draw a bright line dividing the two. Still, for ease of vocabulary, we suggest allowing the industry to recognize all the strategies shown in **Exhibit 5** as passive. Some readers will, for good reason, disagree with calling factor-based investing a passive strategy. Our classification reflects what we have observed as the common vocabulary in the financial industry. Everything else—that is, anything more active than most smart beta strategies—should be considered active.

Time Horizons Reflect Just How Active a Portfolio Is

We now understand how the passive-to-active spectrum connects to the spectrum of longer to shorter time horizons. Time horizons might be a more suitable metric than the commonly-used risk profiles for determining asset allocation for different investors. It is generally assumed that an investor willing to take on more risk also enjoys a higher return. The growth of private

markets, however, has introduced illiquidity premia as an important consideration and is dividing investors between those willing to take on longer-term positions and those who prefer shorter ones. Across the spectrum of investment assets, people are taking on different kinds of risks that are not well expressed by standard deviation, the risk measure that modern portfolio theory relies on. Analysis in the 2024 UBS yearbook (UBS 2024) also suggests that the connection between risk and return over the long run is weak at best.

No investor is truly passive. Rather, investors differ by making longer- versus shorter-term bets. A “passive” lifelong market-cap allocation to global publicly traded stocks and bonds, such as a standard 60/40 allocation, contains an active bet on this asset allocation being the most appropriate for the long haul. Even this portfolio need not be for life. As the underlying fundamentals change with time, any long-horizon allocation might need a few adjustments in a lifetime.

The person in the economy at large who is equivalent to the 60/40 lifetime investor is the one who chooses a job in which they stay for decades. While some people might stay in one place for the duration of their career, long-term changes in the economy force many to switch jobs a few times in a lifetime.

Entrepreneurs are more open to change than passive workers, but there are different degrees of entrepreneurship. An economy’s entrepreneurs who have longer horizons exploit inefficiencies they discover in the economy by introducing new product categories into the market, and by starting, closing, and switching between firms every few years. They can benefit by betting on long-term trends that have yet to play out or on existing developments that they find undervalued by society. The equivalent actors in financial markets are investors who look for long-term discrepancies between price and value that sometimes take years to correct.

Beyond entrepreneurs and investors exploiting price-value discrepancies, we find those with even shorter horizons. In the economy at large, these are fast-paced entrepreneurs who ride on shorter-term sentiments in society and take advantage of the momentum of trends. This might be your latest social media influencer, cryptocurrency provider, or any second-best, me-too product maker. These investors ride on short-term memes and price momentum and exploit excessive reactions and other investor biases. Although such entrepreneurs might be considered less prestigious based on their nonfundamental and short-term nature, they create value and allow for many people to earn a good living.

To apply the ideas presented here, we would develop portfolio allocations for different categories of investors based on the length of the time horizon. In future work, we will build a framework for asset allocation that mirrors the human tendency to act as more-passive or more-active players.

In this brief, we have demonstrated that active investors in financial markets are analogous to entrepreneurs in the economy. As their time horizons get longer, these investors become less active and more passive. While passive strategies of various strengths constitute a large share of the investment landscape, they cannot be understood without a comprehension of their opposite, the active investing of financial entrepreneurs. This is a game of both marathon runners and sprinters. The race is long, and the best way to win is by playing by the time horizon that suits your strengths.

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