WINTER 2021

SACRS

STATE ASSOCIATION of COUNTY RETIREMENT SYSTEMS

WHEN THE FUTURE ARRIVES EARLY

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Full Speed Ahead

"Our first major event of the year, SACRS Annual Spring Conference, was to take place in Long Beach, however, we recently decided, in an abundance of caution, to deliver this conference online only."

Even though the pandemic continues to require restrictions, things here at SACRS have not slowed. Not for a minute.

Have you met our new SACRS president Vivian Gray? If not, let me highlight a few of her accomplishments. She has held several SACRS leadership positions, including vice president of the association and chair of the program committee. She has served Los Angeles County as an employee for more than 35 years, including 10 years as a deputy sheriff for the County Sheriff's Department. She is a senior founding attorney for the Alternate Public Defender's Office and an elected general member trustee for LACERA. I am very excited to work with Vivian and I hope that you take the opportunity to meet her, if you haven't already, at one of our 2021 events.

Our first major event of the year, SACRS Annual Spring Conference, was to take place in Long Beach, however, we recently decided, in an abundance of caution, to deliver this conference online only. Please save the dates of May 11-14 to attend virtually. More information on the program and registration will be coming soon.

Another great event this year designed for public pension trustees and affiliate members is the SACRS Public Pension Investment Management Program presented by UC Berkeley Haas School of Business. If you are interested in attending, registration is now open for the highly rated program. Offered in webinar format July 13, 14, 15 - Tuesday, Wednesday, Thursday (9am - 12:30pm). July 20, 21, 22 - Tuesday, Wednesday, Thursday (9am - 12:30pm). Registrants will receive 24 hours of continuing education and a UC Berkeley certificate of completion.

While we were not able to meet face-to-face in 2020, we hope that we can come together this fall. Save the dates of November 9-12, as we (fingers-crossed) safely gather at the Loews Hollywood Hotel in Hollywood.

These are just a few of the activities and events that we have planned for 2021. Put them all on your calendar and take advantage of the valuable insights, education, and connections of your SACRS membership.

Sulema H. Peterson

P.S. This edition of SACRS magazine continues the tradition of articles shared by members. If you have ideas for a story, consider submitting an article! You can do that by contacting me at **sulema@sacrs.org**.

***Sulema H. Peterson**, SACRS Executive Director, State Association of County Retirement Systems*

NEW YEAR NEW MOMENTUM

"A key focus for me is to keep SACRS sustainable and relevant. Within these two concepts, I believe we can keep moving forward and build on the successes of the past four years to be the place where trustees go to become their very best."

What a relief to have 2020 behind us! It was a year like no other, and while there were so many challenges, I am proud of the way we were able to keep going with our SACRS events and progress toward association goals.

This is my first column for SACRS Magazine as president, and I want to start off by thanking Dan McAllister, immediate past president of SACRS and SDCERA Trustee. Dan had a vision for SACRS to become a world-class organization and to elevate our programs, our bylaws, our communications, and the conference experience for members. I appreciate all that he has done for SACRS, and for helping to make this a seamless transition for me.

We are all the beneficiaries of Dan's vision for our association. It is my intention to continue with his vision in terms of quality, improved member experiences, and opportunities.

At the same time, we have to realize that the world changed in 2020.

A key focus for me is to keep SACRS sustainable and relevant. Within these two concepts, I believe we can keep moving forward and build on the successes of the past four years to be the place where trustees go to become their very best. We need to offer deeply relevant educational opportunities, so that members are always excited to attend a conference, a training, a webinar, or read SACRS magazine cover-to-cover. I want to lead SACRS to be what trustees need TODAY. I know this is achievable because of our dedicated and talented committees and board members; we are so fortunate to have such strong SACRS leaders.

I am excited to be your SACRS president, and to build momentum together as we look ahead to a new season for SACRS post-pandemic.

***Vivian Gray**, President of SACRS & LACERA Trustee*

FACTORS FIRST:

A Risk-Based Approach to Harnessing Alternative Sources of Income

> *"Alternative asset classes such as private credit, real assets (farmland, timberland and private equity infrastructure investments) as well as non-traditional sectors of fixed income (preferred securities, emerging markets debt, high yield corporate debt and leveraged loans) present attractive income-generating potential."*

The income-generating potential of alternatives seems to be largely underappreciated, despite the trend toward larger allocations to alternative asset classes in institutional portfolios and the quest for yield in a low-rate environment. When we ask institutional investors what roles they look for alternatives to play in a multi-asset portfolio, diversification is the top priority, followed closely by total return. Income generation usually is a distant third.

Institutional investors can enhance their ability to capitalize on the yield and diversification benefits of alternatives by focusing on the risks that drive returns in each specific segment of the alternatives universe. This approach allows investors to stitch together multi-asset portfolios in a more efficient, coherent way.

Executing this, however, is no simple task. If done incorrectly, investors risk negating some of the diversification benefits that make alternatives such valuable contributors to stronger, more resilient portfolios.

Know What Risk Factors Drive Return

Alternative asset classes such as private credit, real assets (farmland, timberland and private equity infrastructure investments) as well as non-traditional sectors of fixed income (preferred securities, emerging markets debt, high yield corporate debt and leveraged loans) present attractive income-generating potential.

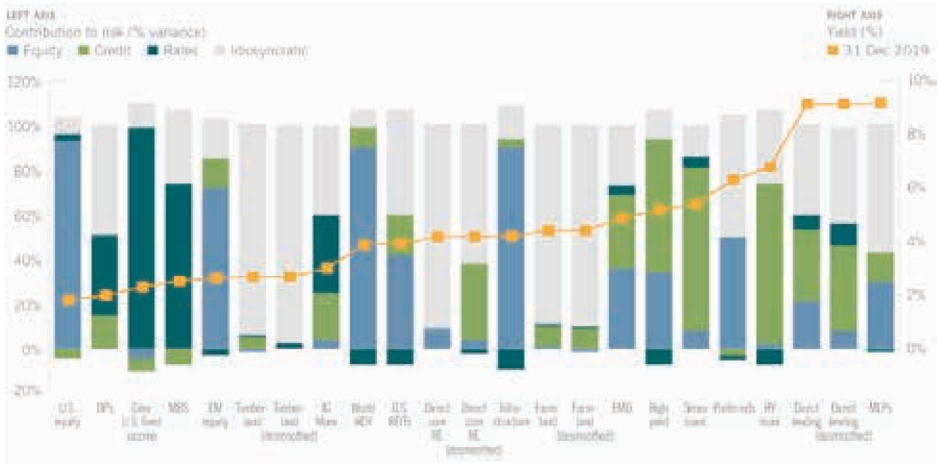
Idiosyncratic risks play a vital role in driving returns in each of these asset classes — and these risks are what institutional investors should be trying to harness in an income-generating multi-asset portfolio. But it is important to note that each of these asset classes has significant exposure, in varying degrees, to the core, broad-based risk factors: equity, credit spread and rate duration.

As the chart below illustrates, idiosyncratic risks account for less than 60% of the contribution to total risk in all of the alternative asset classes included in the chart, except for real estate. With emerging markets debt, for example, equity risk accounts for 36% of the total risk and credit risk accounts for an additional 33%.

Preferreds are also an interesting case. Some investors consider them to be more like an equity instrument while others consider them to be more like fixed income. This debate is easily settled when viewed through a risk decomposition lens, which shows that equity risk and idiosyncratic risk account for the totality of risk for preferreds.

Decomposing Risks Across Asset Classes

Contribution to risk (% variance) versus yield (%)



Source: Bloomberg.

> *“Taking a risk-first approach to multi-asset portfolio construction frees an investor to take a more nuanced and sophisticated approach to managing liquidity risk — not just with alternatives, but across the entire portfolio.”*

This isn't to imply that emerging markets debt and infrastructure aren't valuable diversifiers. Rather, it is to highlight that unless an investor decomposes the risk contributors, a portfolio could end up with significantly more exposure to equity, credit or rate risk than the investor bargained for.

Allocate to Risk Factors, Not Asset Classes

Investors are compensated for owning risk, not asset classes. We believe that their portfolio construction processes should reflect this and we have developed a five-step approach to do just that:

1. Decompose risk factors driving the performance of asset classes
2. Analyze how the market is compensating those risk factors
3. Determine which risks need to be owned to fulfill investment objectives and constraints
4. Determine which asset classes and vehicles will achieve the desired risk exposures
5. Monitor risk and asset class relationships and how the market is compensating risks

The Benefits of a Risk-First Approach

This framework puts risk at the heart of constructing multi-asset portfolios and delivers multiple benefits to investors. As already noted, it reduces the risk of overconcentration of risk factors in a portfolio, which could undermine the diversification benefits investors seek from alternatives.

It also encourages a more nimble approach to pursuing yield. The relationships among the risk factors and thus the relationships among the asset classes are constantly evolving — and the degree to which the market is compensating various risks is always changing. Predefined asset allocation constraints limit an investor's ability to exploit these changes and manage risk.

The framework fosters a more nuanced approach to managing liquidity. Liquidity risk is just one of the idiosyncratic risks of an investment. But when using alternatives to generate income and cash flows needed to fund a set liability, liquidity becomes the idiosyncratic risk that institutions need to understand the best. Taking a risk-first approach to multi-asset portfolio construction frees an investor to take a more nuanced and sophisticated approach to managing liquidity risk — not just with alternatives, but also across the entire portfolio.

Learn More About Harnessing Alternative Sources of Income

An expanded paper on Nuveen.com is available for a deeper dive on our recommendations on risk factor-based portfolio construction, as well as our analysis of specific income-generating alternative asset classes.

We examine four asset classes that offer attractive income-generating potential and discuss the primary risks that drive returns in each: non-traditional sectors of fixed income, private credit, real assets and real estate. We also share our latest views on the opportunities and positioning considerations for each of these asset classes.

Sources: All market and economic data from Bloomberg, FactSet and Morningstar. A Risk-Based Approach To Harnessing Alternative Sources Of Income is available for download at Nuveen.com/en-us/institutional/thinking/asset-allocation-insights/optimizing-outcomes-through-alternatives?utm_source=SACRS&utm_medium=referral&utm_campaign=1T2020_Institutional

***Alice Breheny** is Global Head of Research at Nuveen where she manages a team devoted to researching the real estate market in Europe, the United States and Asia Pacific. She is also a member of the Global Executive Leadership.*

***Justin Ourso**, CFA, is Head of Real Assets at Nuveen and is responsible for leading and developing the strategic direction and investment execution of Nuveen Real Assets' business across the agriculture, timberland, infrastructure and impact sectors, which encompasses more than $20 billion in assets under management.*

***Randy Schwimmer**, is Head of Origination and Capital Markets, Senior Lending at Nuveen and oversees senior lending origination and capital markets for Churchill Asset Management, an investment specialist of Nuveen.*

***Nathan S. Shetty**, CFA, FRM, Head of Multi-Asset at Nuveen, oversees Nuveen's multi-asset team. In addition to managing multi-asset mandates and model portfolios, the team collaborates with the broader investment platform in developing capital markets views, asset allocation advice, and thought leadership for Nuveen's clients.*

***David R. Wilson**, CFA, Head of Global Fixed Income Client Portfolio Management at Nuveen, oversees global fixed income client portfolio management at Nuveen. He is responsible for delivering the firm's broad fixed income capabilities to institutions and individuals globally.*

FEATURED STORY

WHEN THE FUTURE ARRIVES EARLY

The recession triggered by the coronavirus pandemic was so sharp, sudden and intentional that many observers anticipated the recovery would be symmetric in its speed and slope. It was reasoned that once policymakers lifted the lockdowns, economic activity would swiftly revert to prior levels, just as occurs annually in beach towns at the start of the summer season. Unfortunately, a "V-shaped" rebound of this sort was not only unlikely to materialize but also pernicious to expect. Those who its enduring features and may be inclined to manage businesses and investment portfolios backwards towards a world that has ceased to exist.

Make no mistake: the global economy will fully recover and that process has been underway for the past few months.[1] Proprietary data suggest that China's GDP is already at or above year-ago levels; output in the U.S. and many European economies may exceed prior peaks by the end of next year or soon thereafter. The initial snapback in economic activity from the April lows assuaged worries of an even deeper and more protracted downturn. Likewise, July portfolio data provided encouraging news about the durability of the recovery, as the U.S. economy continued to expand even as new virus outbreaks raged in southern and western states that combine to account for nearly a third of U.S. GDP. This recovery has not been a reversion to the status quo ante, however, but a process of adaptation that raises questions about how much future conditions will resemble those of January 2020.

FROM DISPERSION ACROSS SECTORS TO DIFFERENCES BETWEEN COMPANIES

What has been most striking about the recession is not only its unprecedented depth (an -11% to -16% drop in advanced economies' GDP relative to -4% to -5% in 2008-09) but also the degree of dispersion in performance across sectors.[2] While many businesses in information and communications technology and health care managed to grow through the pandemic, lockdowns and social distancing exacted a heavy toll on bars and restaurants, hotels and accommodations, live events, travel and tourism, and energy. Industry-wide earnings in these sectors dropped by -50% or more and their U.S. payrolls have shrunk between -20% and -40% (Figures 1 and 2).

While the drop in discretionary spending on "experiences" accounts for most of the contraction, activity elsewhere has hardly returned to "normal." Survey data from professional services firms in our global portfolio suggest that many business managers have revised down expectations for future revenues and staffing needs (Figure 3). Anecdotes suggest that many executives are not only relying on more conservative forecasts, but also rethinking business fundamentals, even in cases where demand has largely recovered.

Figure 1. Dispersion in Q2-2020 Earnings Growth

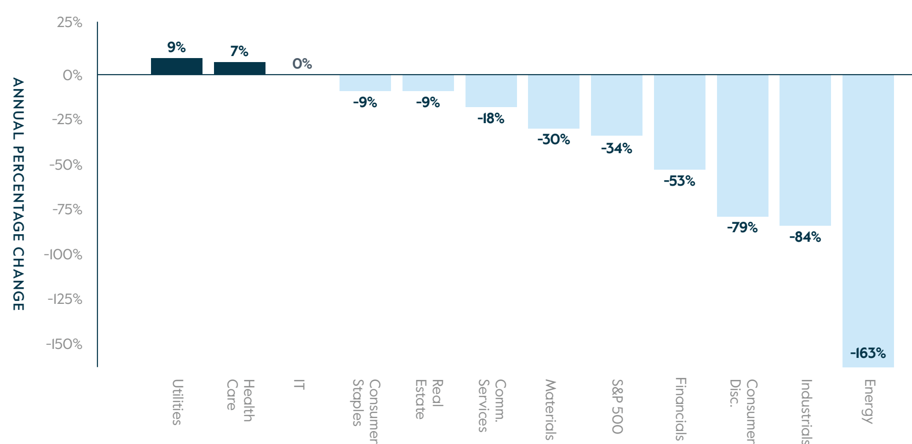


Figure 1. Source: FactSet, August 9, 2020.

Figure 2. U.S. Payrolls Down -20% to -40% in Food Service, Accommodations, Live Events, Transportation & Hospitality

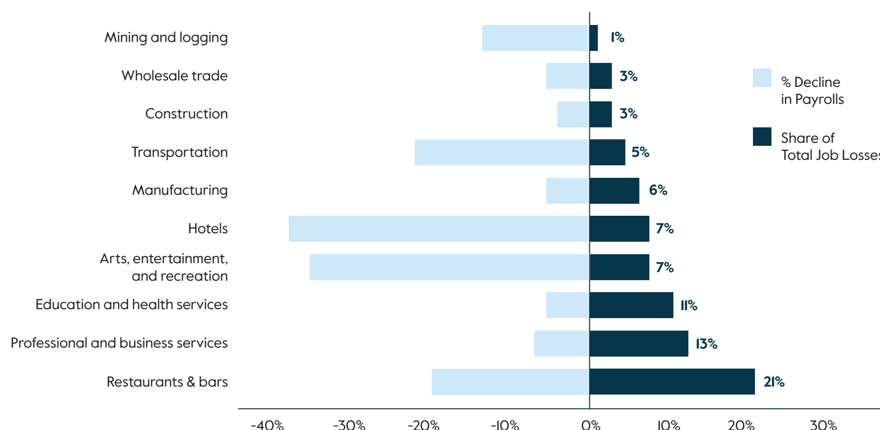


Figure 2. Source: Carlyle; BLS.

Recessions often take on a life of their own. Sudden macroeconomic shocks lead management teams to dial back expansion plans, scrutinize cost structures, reevaluate business lines and production processes, and reconsider broader strategic direction.[3] Rather than being attenuated by the supposed temporary nature of this shock, such critical reassessment has been even more pronounced today because of the scale of disruption to most businesses' operations.

Within a matter of weeks, various companies of all sizes and complexity levels found that they were able to meet or exceed pre-pandemic business volumes with their employees working on a remote basis.[4] While many CEOs

“Rather than a simple and swift return to conditions that prevailed January 2020, this recovery will be a longer-term process of adaptation and reinvention.”

Figure 3. Expected Growth in Revenues and Staffing Needs by Industry

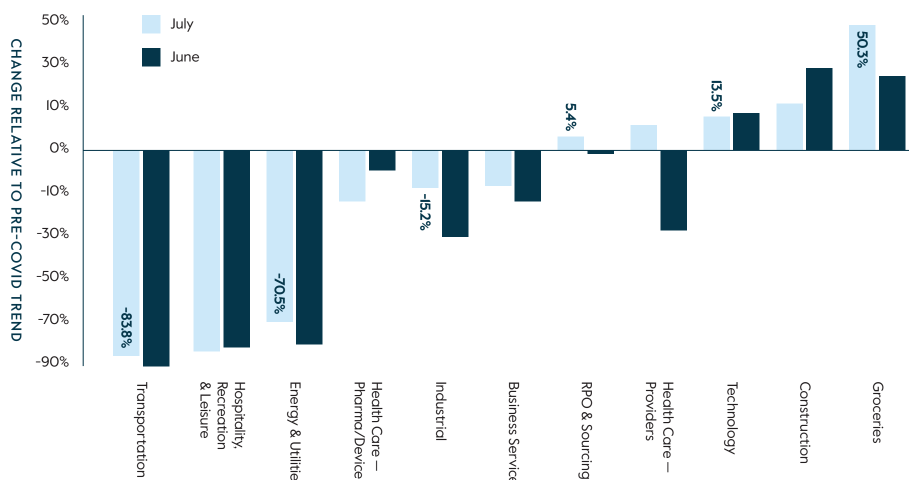


Figure 3. Source: Carlyle Analysis of Portfolio Company Data.

Figure 4. Dispersion in Multiples Across Industry

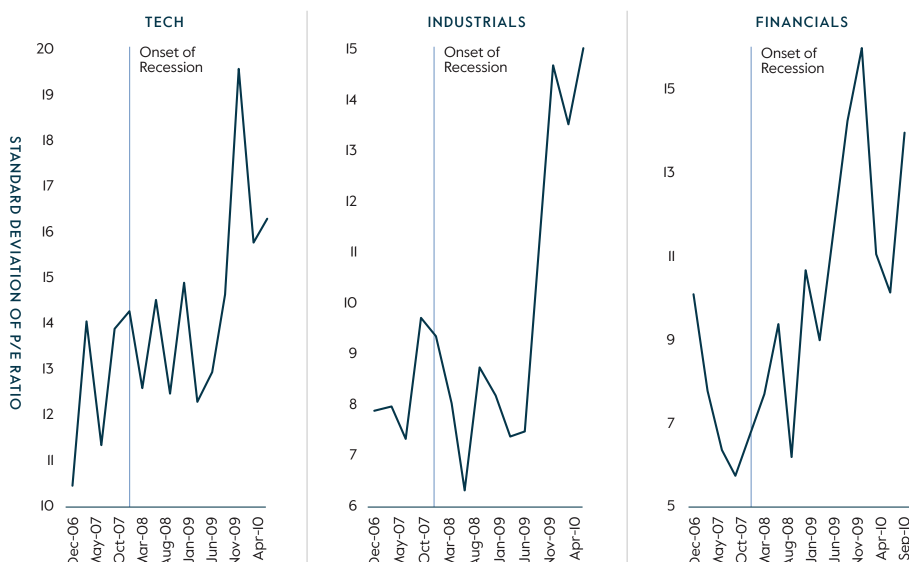


Figure 4. Source: Carlyle Analysis; Bloomberg Data, August 2020.

projected a public sense of assurance and satisfaction that their firms were able to thrive in the face of this real world business continuity test, in private some of these same executives expressed surprise and even awe at the ease with which their companies could adapt to such radical change.[5] Such an experience both opens the mind to more ambitious plans for technology-based business transformation and arouses a sense of vexation about past complacency or inaction.

So while current attention rightly focuses on the wide dispersion in performance across different industries, it is likely that, as in the last recession, the most salient disparities in two years’ time will be between companies within the same industry (Figure 4), as some management teams successfully reinvent their businesses while others futilely endeavor to get back to January 2020.

THE DIGITAL REVOLUTION IN BUSINESS MODELS

The most consequential innovation of the past twenty years may not be a specific application or device, but the way technology facilitated the emergence of new business models. “Taxi” companies arose that didn’t own cars or employ drivers; businesses could enter the hospitality space with no physical assets or employee overhead; and media companies no longer required broadcast licenses, network infrastructure or cable carriage to reach millions of subscribers. The emergence and growth of “virtual” businesses provided conspicuous evidence that, in the digital age, value accrues to ideas, R&D, brands, content, data and human capital – i.e. intangible assets – rather than industrial machinery, factories or other physical assets (Figure 5).[6]

The rise of virtual businesses dovetailed with a complementary shift in investor preferences following the Global Financial Crisis (GFC). When funding markets froze following the Lehman bankruptcy, businesses lost access to external sources of liquidity to finance fixed assets, distribution networks, inventories, payrolls and other liabilities. Suddenly, “size,” “footprint” and “incumbency” came to be understood as an expensive legacy rather than a competitive advantage. Investors wanted companies that were smarter instead of larger, as reflected in the new patois of sell-side flipbooks which now marketed businesses as “agile,” “disruptive,” “nimble” and – especially – “asset light” (Figure 6).

Figure 5. Enterprise Value of S&P 500 Constituents

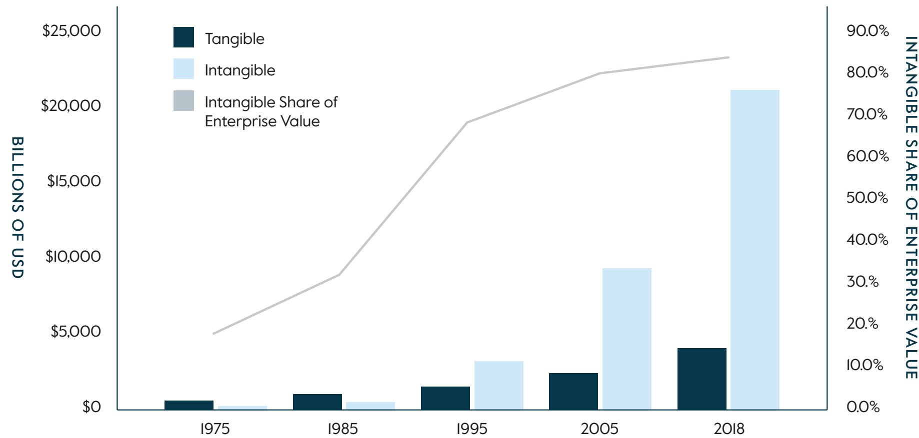


Figure 5. Source: Carlyle; AON, July 2019.

Figure 6. Use of "Asset-Light" to Describe Business Model

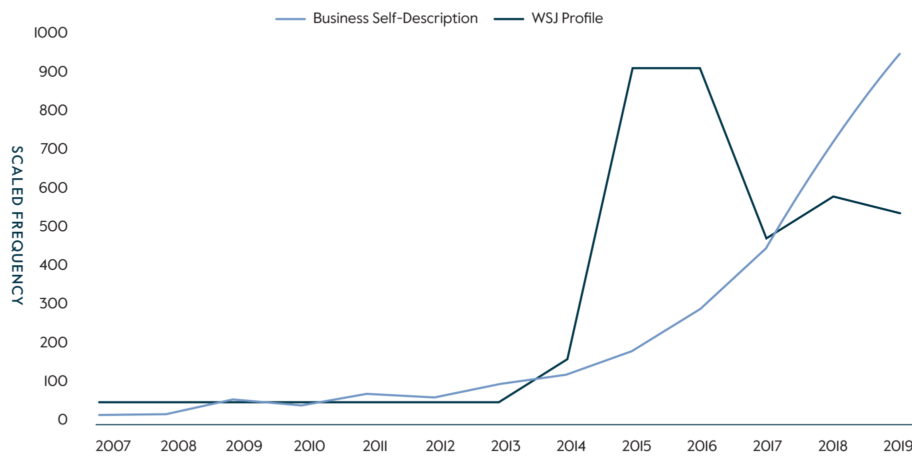


Figure 6. Source: Carlyle Analysis of EGDAR Database and DowJones Text Data.

Figure 7. Intangibles' Share of (Measured) Business Investment

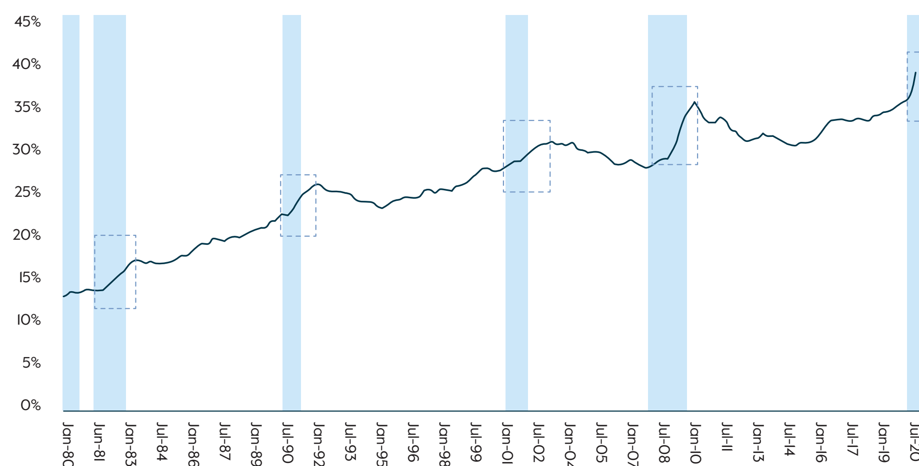


Figure 7. Source: Carlyle Analysis, Bureau of Economic Analysis, August 2020.

This shift not only shaped new firm formation – asset-light businesses in idea-intensive industries now attract the bulk of start-up funding[7] – but also contributed to broader and more meaningful changes in corporate strategy and organization across the economy.

For example, consider what these developments mean for a (hypothetical) vertically-integrated beverage manufacturer. While virtually all of its enterprise value likely comes from brand, trade secrets (formulas) and the human capital involved in product development and marketing, nearly all of its financing needs and associated risk come from its concentrate manufacturing plants, bottling facilities, and warehouses and delivery trucks.[8] In an era when technology allows these discrepant aspects of the production process to be unbundled, why not divest the lower value-add, capital-intensive parts of the business and focus on data-driven product development and marketing and algorithmic intermediation between contract manufacturers, bottlers and distributors?[9]

In many cases, reinvention on this scale may seem too radical for an otherwise healthy business to contemplate. Inertia can be a powerful force, as business practices and organizational forms tend to reflect precedents rather than optimal arrangements.[10] Technology facilitates business transformation,[11] but change ultimately depends on the initiative of management teams and the investors who back them. That's where recessions come in: while expansions can breed complacency, macroeconomic shocks often spur rethinking that accelerates the evolution of business models.

INTANGIBLES INVESTMENT & JOBLESS RECOVERIES

Intangibles investment is notoriously difficult to measure, both at the individual company and national economy level, but the (small) portion of intangibles recorded in GDP – spending on R&D, software, patents and content – has been rising steadily over time and tends to jump as a share of total business investment during

Figure 8. Most of the Productivity Growth in the Business Cycle Occurs in the Two Years After Recession

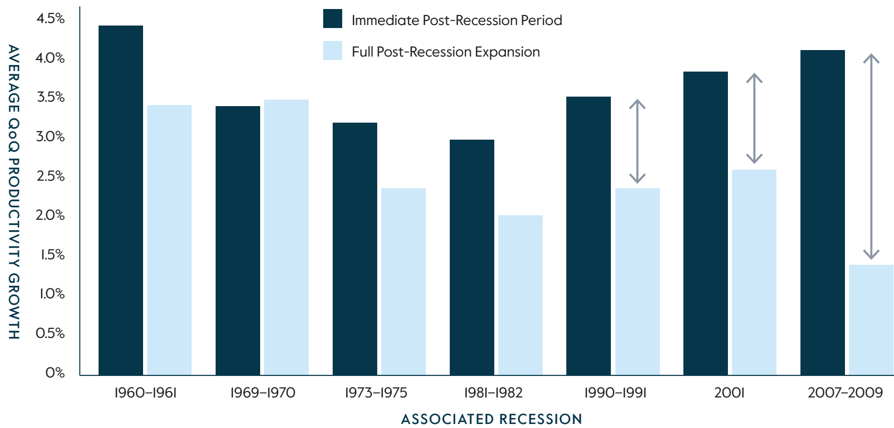


Figure 8. Source: Carlyle Analysis; Bureau of Labor Statistics; NBER.

Figure 9. Change in Intangibles' Share of Total Fixed Investment Spending, Pre- vs. Post-Recession

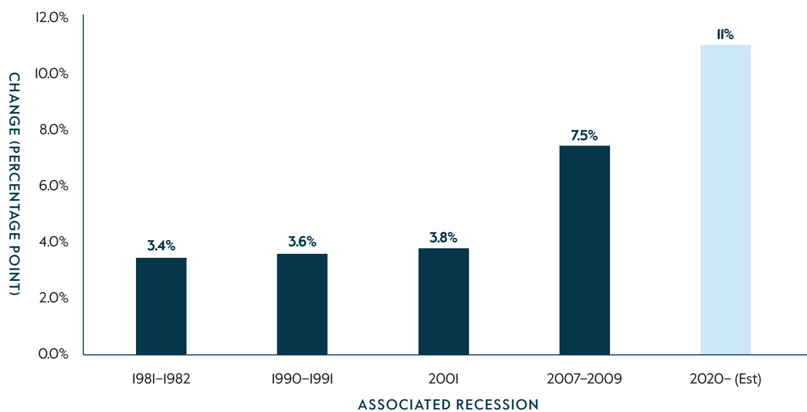


Figure 9. Source: Carlyle Analysis, Bureau of Economic Analysis, August 2020.

Figure 10. Increasingly Jobless Recoveries

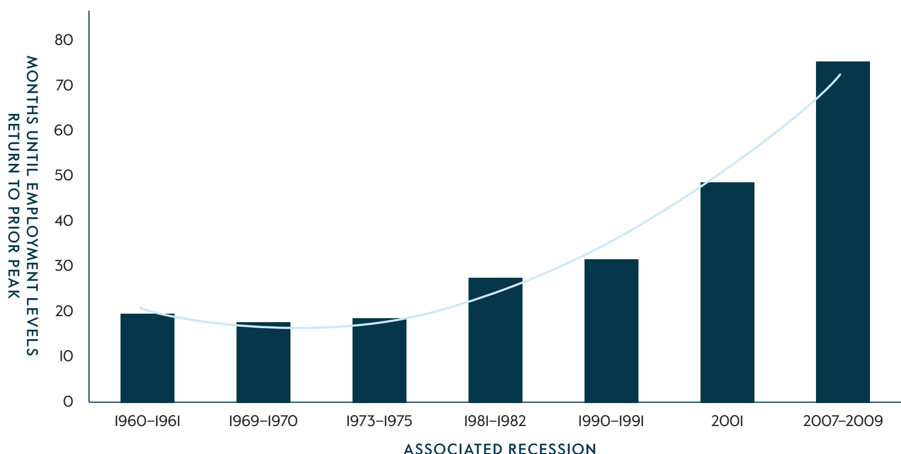
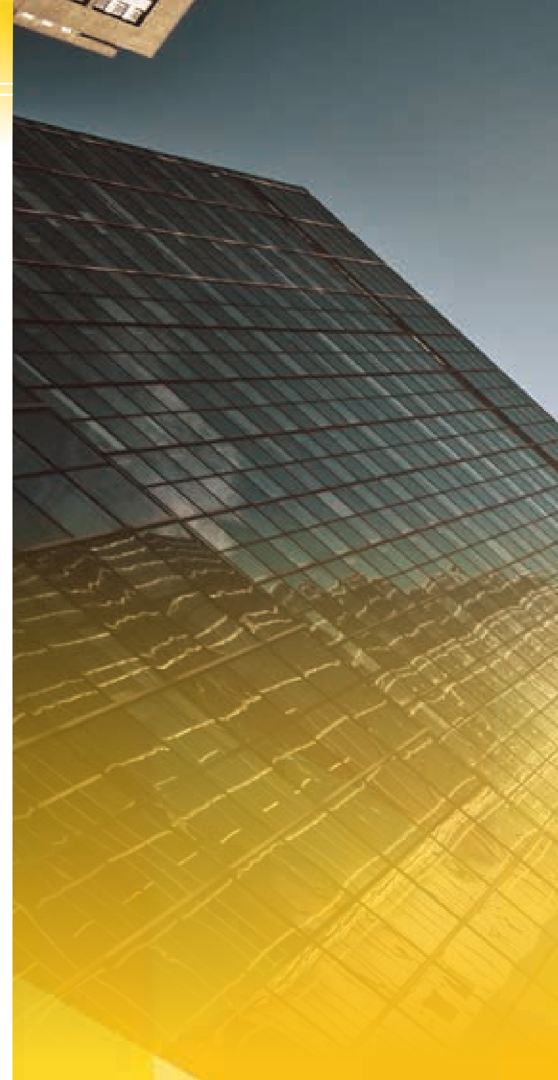


Figure 10. Source: Carlyle Analysis; Bureau of Labor Statistics; NBER.



recessions (Figure 7). Intangibles spending is not just the last line item to be cut in downturns; cost-conscious managers often increase spending on inventory management technology, customer acquisition software and other intangibles to increase efficiency and dampen the practical impact from cutbacks in other areas. It should be no surprise that during the past three business cycles, most of the productivity growth observed over the entirety of the expansion occurred in the two years following the surge in intangibles' share of total corporate outlays (Figure 8).

The remote working experience of 2020 seems destined to erode the importance of physical assets further in the minds of executives and accelerate spending on research, customer acquisition, and data management capabilities.[12] Proprietary data suggest that the intangible share of measured business investment could rise 11% in this recession, nearly 1.5x the record increase observed in the "asset light"

“While the most obvious differences in economic performance today are between industries, within two years the wider dispersion will be between businesses operating in the same industry.”

revolution following the GFC (Figure 9). In the short-run, such spending tends to be motivated by a desire to do more with less. Past increases in the intangible share of corporate outlays have been associated with slower recoveries in employment (Figure 10). If that relationship holds this cycle, a return to full employment in the U.S. may be much further off than the late-2021-or-2022 recovery in GDP.

FROM THE “VALUE PREMIUM” TO THE “VALUE TRAP”

The rise of digital business models and intangible assets has led to a profound shift in historical riskreturn relationships. For decades, “value investing” has been predicated on the notion of a “margin of safety,” conventionally measured as the difference between the market price of the asset and its “intrinsic value.” Academic research found that the ratio between the price of a stock and its book value per share provided a reliable proxy for “value,”[13] as stocks with the lowest price-

Table 1. Returns by Price-to-Book and Price-to-Earnings Ratios

ANNUALIZED STOCK RETURNS — VALUE PREMIUM 6.5% PER ANNUM

	Value Stocks (Lowest P/BV)	Growth Stocks (Highest P/BV)	Differential
1950-59	25.06%	20.92%	4.14%
1960-69	13.23%	9.57%	3.66%
1970-79	17.05%	3.89%	13.16%
1980-89	24.48%	12.94%	11.54%
1990-99	20.17%	21.88%	-1.71%
2000-09	8.59%	-0.49%	9.08%
2010-19	11.27%	16.67%	-5.39%
2020	-33.29%	15.59%	-48.88%

ANNUALIZED STOCK RETURNS — VALUE PREMIUM 7.5% PER ANNUM

	Value Stocks (Lowest P/E)	Growth Stocks (Highest P/E)	Differential
1950-59	29.25%	17.90%	11.34%
1960-69	12.73%	8.35%	4.38%
1970-79	12.09%	-0.29%	12.37%
1980-89	17.67%	12.74%	4.93%
1990-99	19.43%	20.45%	-1.02%
2000-09	11.49%	-3.78%	15.26%
2010-19	10.15%	16.37%	-6.22%
2020	-17.49%	16.79%	-34.28%

Table 1. Source: Carlyle Analysis, CRSP Data, August 2020.

"As the pace of digitization accelerates, investors would be better served to think in terms of the differences between business models rather than differences between industries. "Technology" may no longer be viewed as an industry in its own right, but instead understood as the key differentiator between all companies irrespective of industry."

to-book ratios outperformed stocks with the highest price-to-book ratios by about 6.5% per year, on average (Table 1). This outperformance came to be known as the "value premium," and provided academic substantiation for many practitioners' rules-of-thumb regarding risk and return relationships and portfolio strategy.

In the industrial age, "book value" served as a reliable measure because virtually all of a company's productive assets were recorded on its balance sheet. Any deviation between "book" and "intrinsic" values reflected differences in depreciation or inflation rates. "Book" could overstate fair value if the effective depreciation rate of plant and equipment exceeded the accounting expense; likewise, book could understate fair value if an increase in wages and material costs made the same capital equipment more expensive to reproduce. Often, these differences would net to zero and the book value per share remained an unbiased proxy for the intrinsic value of most businesses.

In the digital age, this paradigm no longer holds. Current accounting rules do not allow internallygenerated intangible assets to be capitalized and recorded on balance sheets.[14] As a result, intangible assets account for nearly 85% of corporate enterprise value (Figure 5, above), but are not reflected in the book value unless they are acquired and characterized as goodwill.[15] These missing assets have not only caused price-to-book to lose its explanatory power, but caused the historical relationship to reverse over the past decade. Between the start of 2010 and the end of last year, the stocks with the widest "margin of safety" (lowest price-to-book) actually underperformed their most "overvalued" counterparts (highest price-to-book) by -5.4% per year, a 1.6x difference in ten-year cumulative returns. This trend intensified in 2020, as "value" investments underperformed the highest price-to-book stocks by nearly -50% through the first half of the year (Table 1). Rather than signal that a company is overvalued, a high price-to-book ratio would seem to indicate the presence of highly valuable intangible assets like user and customer data, proprietary algorithms and technology, and human capital.

Figure 11. Annualized Returns by Industry, January 2010 – June 2020

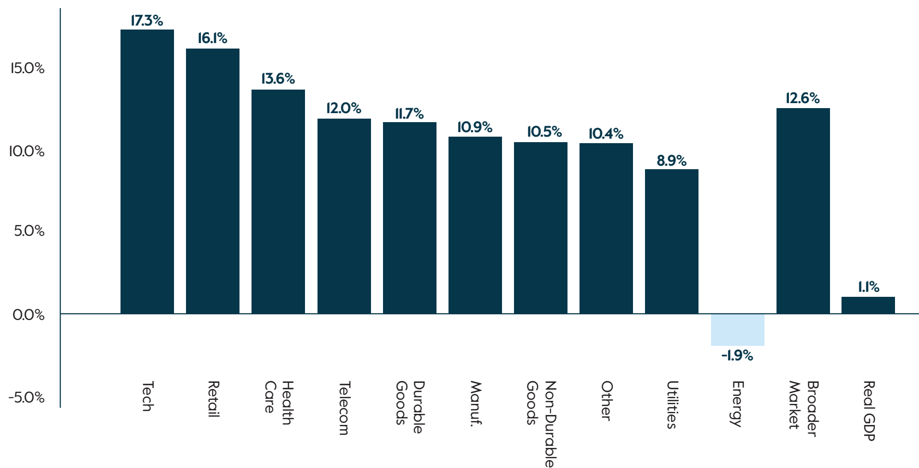


Figure 11. Source: Carlyle Analysis, CRSP, BEA, August 2020.

Figure 12. Five Mega Cap Stocks Account for All of the S&P 500 Gains in 2020

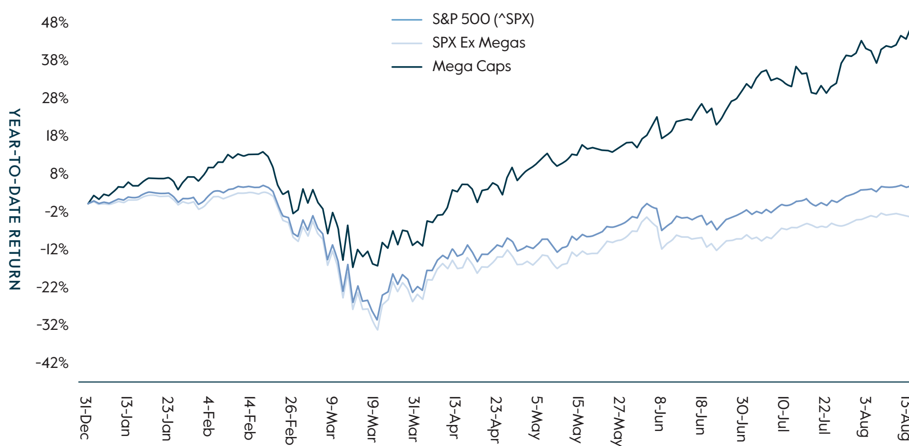


Figure 12. Source: S&P Capital IQ Database.

Figure 13. Industry YTD Returns: 2020 through June 30

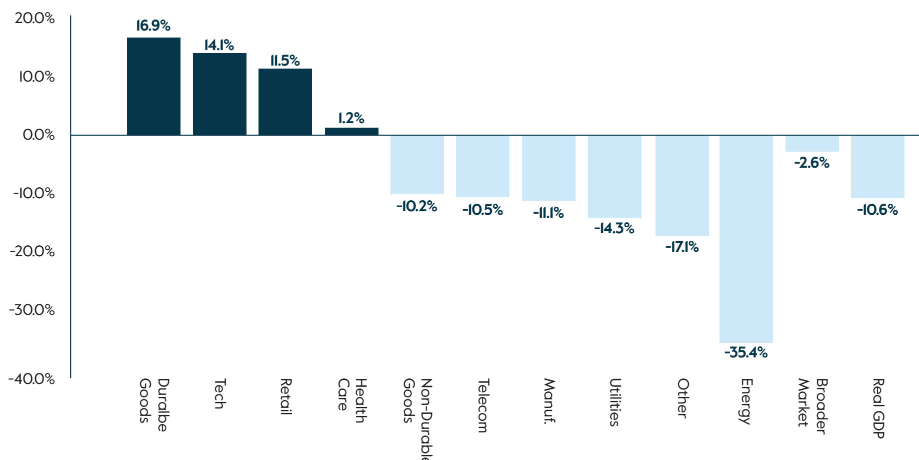


Figure 13. Source: Carlyle Analysis, CRSP, BEA, August 2020.

These returns data do not suggest that "value" is dead as a concept, but that true value has become much harder to ascertain. The problem is not only that intangible assets are hard to value and missing from accounting statements, but that investors must also grapple with the risk of functional obsolescence. In the past, discounts to book value were a sign that the assets or businesses were undervalued; buying a factory for $75 million that would cost $100 million to rebuild provides a "day one" return and valuable downside risk protection. Since the GFC, these discounts mostly provide compensation for the risk of technological disruption or disintermediation. Returns data suggest that such compensation has thus far proved inadequate.

It may be that "asset-heavy" value stocks underperformed to such a great extent this year precisely because remote working has sensitized investors to the risk that future cash flows will come to depend less on physical assets, like offices. As the pace of digitization accelerates, this risk premium for obsolescence may have to widen further, turning the "value premium" into a "value trap."

THINKING IN TERMS OF BUSINESS MODELS RATHER THAN INDUSTRIES

Analysis of cross-sectional differences in returns also suggests that most of what investors consider to be the outperformance of the "technology" sector actually goes away when controlling for business model. That is, tech-enabled digital platforms tend to outperform the broader market whether their primary businesses are in health care, retail, autos, or beverage manufacturing. The technology sector's outperformance over the past decade (Figure 11) largely reflects the fact that so many of the software, internet and data analytics firms in the space have "asset light" business models with market values that depend largely, if not entirely, on intangibles like human capital, R&D, and proprietary data and technology.

Much has been made of the extent to which public market returns in the U.S.

have come to depend on the largest "tech" businesses. The top-five U.S. stocks by market capitalization have returned 48% year-to-date (through August 21) compared to a net loss of -3.3% for the rest of the S&P 500 (Figure 12). As a result of this disparity, these five mega cap stocks now account for nearly 25% of the index, up from 17% at the start of the year. But, it is important to note, only two of these five businesses are classified as "Information Technology" (Apple and Microsoft); two fall in the "Communications Services" sector (Alphabet and Facebook) and the other is categorized as "Consumer Discretionary" by S&P and "retail" by its Standard Industrial Classification (SIC) code (Amazon). Indeed, when expanding the analysis to all publicly-listed companies and sorting stocks by primary line of business (SIC code), "tech" isn't even the best performing industry of 2020 (Figure 13).

If we ignore industry, and instead think in terms of business model, a clearer pattern emerges. When sorting stocks into deciles based on their priceto-book ratio, returns rise almost monotonically whether measured year-to-date, over the past 12 months, or on an annualized basis from the start of 2010 (Figure 14). The correlation in returns across deciles is sufficiently high to suggest that business model captures most of the cross-sectional variation traditionally ascribed to industry.16 If these trends hold, 2020 may be the year that "technology" stopped being thought of as a sector in its own right and more of the key differentiator between all companies irrespective of industry.

CONCLUSION

Rather than a temporary blip that quickly recedes from memory, the coronavirus recession will impact economic and financial conditions for some time to come. Recessions often take on a life of their own. Many corporate executives will use this time as an opportunity to rethink and re-imagine their businesses in ways that accelerate the pace of digitization and cause more investors to categorize in terms of business models rather than industries. Traditional notions of "margin of safety" will have to be rethought to account for the value derived from intangible assets and the risks of disintermediation and disruption embedded in physical assets. There is nothing wrong with optimism, but those who conceive of this shock as a temporary disruption seem likely to miss much of what's to come.

Figure 14. Returns Sorted by Price-to-Book Ratio

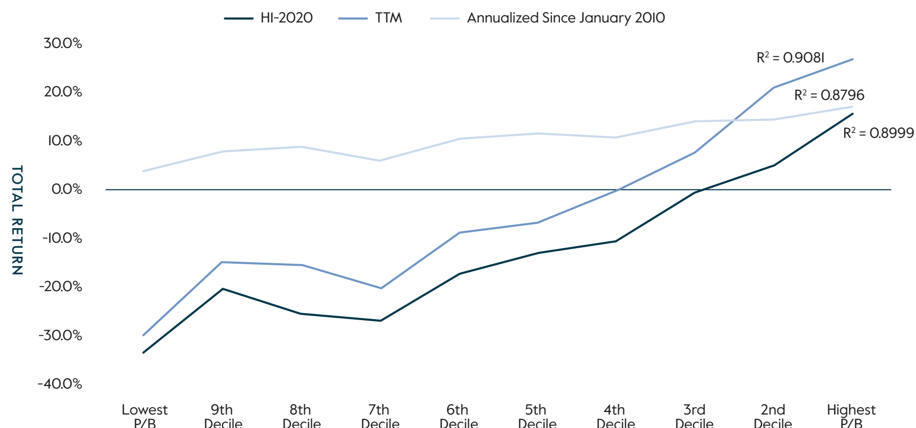


Figure 14. Source: Carlyle Analysis; CRSP Data, August 2020.

***Jason Thomas** is the Head of Global Research at The Carlyle Group, focusing on economic and statistical analysis of Carlyle portfolio data, asset prices, and broader trends in the global economy. He is based in Washington, DC.*

Thomas serves as Economic Adviser to the firm's corporate Private Equity, Real Estate, and Credit Investment Committees. His research helps to identify new investment opportunities, advance strategic initiatives and corporate development, and support Carlyle investors.

[1] There are no guarantees that this will actually materialize.

[2] BEA, NIPA Accounts, August 2020. FactSet, August 2020. EuroStat, August 2020. Refinitiv, August 2020.

[3] C.f. Ilut, C. and M. Schneider. (2012), "Ambiguous Business Cycles," NBER Working Paper 17900. Li, N. and V. Martin. (2018), "Real Sectoral Spillovers: A Dynamic Factor Analysis of the Great Recession," IMF Working Paper 18/100.

[4] Carlyle analysis of portfolio company data; Institute for Supply Management, Services, August 2020.

[5] C.f. Wall Street Journal, June 24, 2020: "Executives were amazed at how well their workers performed remotely," and Wall Street Journal, July 25, 2020, "The Work-From-Home Shift Shocked Companies—Now They're Learning Its Lessons."

[6] McKinsey Global Institute, "Playing to Win: The New Global Competition for Corporate Profits," 2015.

[7] "Value of venture capital investment in the United States," Data through Q2-2020, Statistica.

[8] Wall Street Journal, March 22, 2016.

[9] C.f. "Giants Can Dance: Agile Organizations in Asset-Heavy Industries," McKinsey & Co., 2019.

[10] Rumelt, R. (1995), "Inertia and Transformation," Resources in an Evolutionary Perspective: Towards a Synthesis of Evolutionary and Resource-Based Approaches to Strategy. Klumer Academic Publishers.

[11] C.f. Baldwin, R. (2016), The Great Convergence: Information Technology and the New Globalization, Harvard University Press.

[12] Crouzet, N. and J. Eberly. (2018), "Intangibles, Investment and Efficiency," American Economic Review.

[13] Fama, E. and K. French (1993), "Common Risk Factors in the Returns on Stocks and Bonds," Journal of Financial Economics.

[14] FASB, "Internally Generated Intangible Assets," July 2019.

[15] Microsoft's $26 billion acquisition of LinkedIn is perhaps the best manifestation of this phenomenon. C.f Short, J. and S. Todd. (2017), "What's Your Data Worth?" MIT Sloan Management Review.

[16] It is important to note that while companies with valuable intangible assets and relatively few physical assets at risk of disintermediation would have high price-to-book ratios, some high price-to-book companies may in fact be overvalued. The data simply indicate that these situations have been rare over the past decade relative to the industrial age when high price-to-book reliably signaled that a business was overvalued.

SACRS Hosts Dynamic Virtual Fall Conference

Attendees Engage During Innovative Virtual Experiences

The Renaissance Indian Wells Resort & Spa in Indian Wells, Calif. was the original location for the 2020 SACRS Annual Fall Conference, however, with COVID-19 cases on the rise, the SACRS Board wisely decided it should be offered virtually.

SACRS conferences have long been recognized as a valuable asset. A goal of the Annual Fall Conference organizers was to be sure that the transition to online would retain the commitment to continuous education and networking opportunities. Ultimately, SACRS conference organizers produced so much more than just a live stream event for its members, offering instead a conference as unique as the year 2020 itself.

PRESIDENT ADDRESS

Conference attendees were welcomed to the first full day of the event with an address by Vivian Gray, President of SACRS & LACERA Trustee.

"Being able to do our SACRS activities, like last night's networking reception and today's Fun Run, helps to bring some normalcy, doesn't it?" she asked the online attendees. "Although this year has been anything but normal, we have not let that stop us."

Gray spoke of her appreciation for all those that helped to keep SACRS going throughout the pandemic and the work to put the conference together, never losing sight of the goal of the conference, saying:

"We at SACRS are dedicated to you and your continued education and to inform you of what you need to know now. And right now, we are in the midst of some challenging times, well, more than challenging times," Gray admits. "But at SACRS, we have great people to help us through. Some very smart people that will share their wisdom and insights."

EDUCATIONAL OPPORTUNITIES

The program, which ran from the early afternoon of November 10 to the late afternoon of November 12, concluding with a SACRS Annual Business Meeting on November 13, was full of rich opportunities for Administrators, Affiliates, Attorneys, Internal Auditors, Trustees, and other SACRS members.

With a variety of need-to-know general sessions and breakouts, the days were packed with insightful speakers. An especially timely November 11 general session, titled 2020 Vision: The Consequences of the Presidential Election, was presented by Ron Insana with CNBC, a pioneering financial journalist who has covered the most important economic stories over his nearly four decades on television. Equally timely, was the November 12 session, Pandemic Economy: A Perspective Looking Forward, where Sam Austin with NEPC moderated two macro economic experts, Bob Doll, Senior Portfolio Manager and Chief Equity Strategist at Nuveen Investments and Richard Jerram, Chief Economist for Top Down Macro, who shared their view of the economy and the pandemic going forward.

There was also time in the schedule for many breakout sessions including:

- Aging in America: Current Realities and How Do We Plan for the Future?
- Take the Bull by the Horns in Your Farmland and Real Estate Debt Investments
- Renewable Energy and Sustainable Infrastructure: An Overview of Project Financing
- The Impact of Pension Dollars in Rural Counties
- SACRS 2020 Legislative Update

As an added bonus to conference attendees many sessions were available for replay on the conference platform for several weeks following the conference.

NETWORKING AND INTERACTION

The SACRS Annual Fall Conference proved that translating the networking component of a face-to-face conference to the virtual setting is possible. Fostering good exchanges, SACRS held its first-ever virtual networking lunch, where conference attendees could network with other attendees.

There were 13 or more individuals on the networking session that Brian Rowe from First Quadrant attended because he was "Curious to see how this thing works." There he met Kamila Kowalke from BMO Global Asset Management and Edward Robinson from Kern County Retirement Association for the first time, among others. The networking events were also places to go for those that wanted to reconnect. Elizabeth Lee, Lacers (LA City Employees' Retirement System) had met Susan Lee, SamCERA (San Mateo County Employees' Retirement Association) at the SACRS Public Pension Investment Management Program in Berkeley. Elizabeth Lee noted that while it was "too bad they could not sit [in person] next to each other" the two had still made arrangements to meet during the networking lunch.

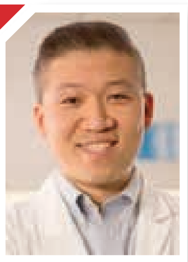
The only negative comment was that the event organizers, when it was time to restart the speaker program after lunch, had the control to stop the online networking event. But because the participants were having such a good time talking and getting to know each other, they did not want their time to end!

Even as successful as the online 2020 SACRS conferences were, and with the 2021 Virtual Annual Spring Conference to be held May 11-14 clearly on the horizon, conference organizers are hoping that SACRS might be able to host the 2021 Annual Fall Conference, November 9-12, as a face-to-face event at the Loews Hollywood Hotel in Hollywood, Calif.

SHORT TAKES

Conversations with Fall Conference Keynotes

If you missed the 2020 SACRS Annual Fall Conference, here are selected highlights and takeaways from a few of the conference headliners.



DR. ERIC FEIGL-DING

Dr. Eric Feigl-Ding (Eric Ding) is an epidemiologist and health economist and a Senior Fellow at the Federation of American Scientists in Washington DC, and Chief Health Economist for Microclinic International. In January 2020, he was recognized in the media as one of the first to alert the public on the pandemic risk of COVID-19. In his presentation, California Recovery/COVID-19, Dr. Ding updated attendees on the Coronavirus in the U.S., how other countries are fairing, and when mask mandates might end.

SACRS Magazine: How is America doing in the fight against the Corona Virus?

ED: We have been lackadaisical in this country. Anyone coming into our borders can enter without testing, or contract tracing, we did not test fast enough nor implement contact tracing early enough. Altogether, there is a lot we have done wrong and we are paying the price.

SACRS Magazine: What countries have done a better job?

ED: Countries including Taiwan, New Zealand, Japan, and Australia took precautions early, correctly assumed the virus was airborne, and quarantined quickly. There also was solidarity in wearing masks. The countries that were the most aggressive and strict now have their economies back.

SACRS Magazine: Why do you think America isn't doing as well as some other countries?

ED: In America we have rugged individualism. People do not want to wear masks and they do not want to participate in mass testing. No one likes a shut down, but it is what we need to do to catch up. In this case it's the health care system that needs to catch up. That's what we have to do when things get out of our control. Business leaders have to understand, it is like a zoo with a lion roaming around loose. If you remain open, will parents and kids still want to come to the zoo? No. So until we get zero COVID or extremely close to that, businesses will never fully recover.

SACRS Magazine: So how will America catch up?

ED: We will have to rely on the vaccine. But we know there is anxiety about it. One in three Americans say they *will* take the vaccine, one in three say they *may* take it, and one in three say they will *not* take it. You can have a 100% effective vaccine hypothetically, but if a third to a half of the people won't take it, you might as well have a 50% effective vaccine.

SACRS Magazine: When do you predict we can stop wearing masks?

ED: The general population won't start getting the vaccine until late spring or early summer, and it will take months and months to not only roll out, but also convince people that the vaccine is safe. We need to aim for 70 to 80% vaccinations in this country at minimum in order for herd immunity to kick in. Hopefully, by then we won't have as many people infected, and masks, distancing, and all the other things to reduce transmissions will add together with the vaccine. But we can't let up on the brakes on these interventions; we have to slowly let up. In terms of getting our lives back to normal, it will be next fall, if not 2022. People hate to hear that, but we can't snap a finger and get everybody vaccinated.

SACRS Magazine: What is your recommendation for staying safe from COVID until we reach herd immunity?

ED: Testing is important, but it is not foolproof. Distancing in itself is not enough. We have to take the multi-layer castle Swiss cheese approach, where we assume every layer has a few holes in it. However, if you put enough layers back-to-back-to-back, the chance of you getting the virus drops precipitously. You must assume that nothing is perfect, and take as many precautions as you can.

SUNEEL GUPTA

Suneel Gupta is the author of the upcoming book, *Backable: How to Inspire People to Believe in Your Ideas*. The book is rooted in Suneel's experiences building startups, running for U.S. Congress, teaching entrepreneurship at Harvard, and serving inside Kleiner Perkins, which the *New York Times* named Silicon Valley's most famous venture firm. In an encore appearance to SACRS, having appeared in 2019, Gupta returned with Backable 2.0 to discuss how Backable people have a seemingly mysterious superpower that lies at the intersection of "creativity" and "persuasion" and to give immediately actionable techniques on how to become Backable.

SACRS Magazine: In your presentation you talked about how Backable people take time to incubate an idea.

SG: In studying Backable people one of the things I learned that makes Backable people stand out isn't charisma, it's conviction. Backable people take the time to convince themselves first, before they try to convince others, and that conviction shines through. The mistake that people make, and I have done this plenty of times myself, is I come up with an idea I love and I rush out and share it with someone right away. The problem is if that person doesn't give me the exact reaction I'm looking for, it can be disheartening.

When it comes to ideas inside of companies, most ideas are not killed inside the boardroom. Most ideas are not killed inside a conference room. Most ideas are killed at the water cooler or in the hallways, because we rush out and share the ideas before they are ready. If someone gives us the wrong reaction, we tend to put it in a drawer and tuck it away. But Backable people always take time to incubate their own ideas.

SACRS Magazine: How can someone become more Backable?

SG: One thing that Backable people build is a circle of people around them to help them become more Backable. I have identified four types of people in the circle:

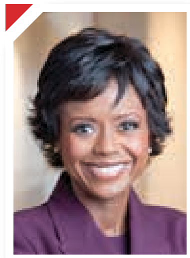
The Collaborator – This is someone that helps expand on ideas and practices.

The Coach – Different than the Collaborator, the Coach has a focus on you, knows you really well, and ensures that the idea is something that makes you come alive or is meaningful to you.

The Cheerleader – This individual may not make the idea better, but they will help you build your confidence.

The Cheddar – This one takes a little explaining. In the movie 8 *Mile* with Eminem there is a character named Cheddar. He is the guy that is always poking holes in ideas and saying, "yeah, but what about. . ." We tend to shy away from the Cheddars in our lives and we don't share too much with them. But Backable people embrace Cheddars, because Cheddars can get us prepared better than most people.

The other thing to keep in mind is that most people learn how to be Backable; it's an acquired ability.



MELLODY HOBSON

As Co-CEO & President at Ariel Investments, Mellody Hobson is responsible for management, strategic planning, and growth for all areas of Ariel Investments outside of research and portfolio management. Additionally, she serves as Chairman of the Board of Trustees of the Ariel Investment Trust, the company's publicly traded mutual funds. Outside of Ariel, Hobson is a nationally recognized voice on financial literacy and she has conducted extensive research on minority investing patterns and pens a column for *Black Enterprise Magazine*. In her SACRS presentation, Land of the Free, Home of the Color Brave, Hobson discussed diversity, inclusion, and race.

SACRS Magazine: One of the first things the SACRS attendees learned about you is that you started at Ariel Investments as an intern, and that you have been at the company for 29 years, rising to Co-CEO. To what do you attribute your success?

MH: There have been a lot of contributing factors. Certainly a lot of people invested in me, too many to name, but my gratitude runs deep. Starting with my mother and my siblings, I grew up surrounded by people who were truth-tellers, they didn't tell me what I wanted to hear, they spoke their truth to me about how I could be a better person and grow. I'm so indebted to John Rogers [Chairman, Co-CEO and Chief Investment Officer at Ariel Investments, which he founded in 1983] for his leadership, for the potential that he saw in me, and how he encouraged me to be my own person. My very first day at Ariel he took me to lunch, I was 22 years old, and he told me, "You are going to be in rooms with people that make a lot of money and have really big titles, but it doesn't mean they have better ideas. I want to hear your ideas." That is the definition of inclusion. Inviting me into the conversation, this young person. That really set the tone for the time that we have had together for almost three decades.

SACRS Magazine: Sam Austin, partner and member of the Public Fund team at NEPC, who moderated your SACRS session, quoted a study commissioned by the Knight Foundation on the state of diversity in the U.S. asset management industry. The study found that less than 10% of asset management firms are minority owned and together those firms manage less than 1% of the industry's assets. He asked why you thought those disparities exist and if there is anything the industry can do to resolve the gap?

MH: I believe part of the reason our industry is woefully behind is because our mental models have not been able to accommodate the visual of people of color when we think of money and managing billions of dollars. When you think of that stewardship and that responsibility, we don't fit the mental model. Instead it is an older white man with greying temples and some kind of square jaw. This is what unconscious racial bias is. We just don't know we are doing it. This comes up time and time again in our society and yet the good news is there are people like you [Austin] and me that have made it through and who now have the responsibility to pull others through. There are so many qualified people who are Brown and Black and eager to be contributors in this community, yet all we need is the opportunity.

SACRS Magazine: Another visual that you like to use is the all Black boardroom. Explain that.

MH: I say imagine if you walked into the Board of Exxon Mobil, one of the biggest companies in America, and you looked around the table and every one of them was Black. You would say, "What is up with that?" And yet, there are plenty of boardrooms in America today that are made up of all white males and that doesn't even break our mental model. White males make up 30% of the U.S. population, but 70% of all corporate board seats. And we don't blink an eye at that. But the fact that we can have this conversation openly and directly, helps me to believe we can move the needle, especially with this audience because so many SACRS members have the power to effect change.

Honestly, it is a head-scratcher to me that we are in an industry that preaches diversification of portfolios and yet we don't have diversity around us. We just haven't carried it into all the areas of our lives that will ultimately benefit from it.

SACRS Magazine: Like the title of the session you presented for SACRS, you also have a TED Talk called Land of the Free, Home of the Color Brave, in which you describe the difference between being colorblind and being color brave.

MH: Here is what got my attention with the word colorblind: I have so many well-intentioned friends both professional and personal, who say they are colorblind. And I would bristle every time I heard the word, because what I realized and I would point out to them, with deep respect, is that they were often members of the majority community, and everyone around them looked like them. The problem with that is it means race isn't being seen, because it's missing. Instead of being colorblind, and ending up in this homogeneous setting, I tell people to be color brave and to really start to see the absence of people of color. That was a defining moment for me. It allows us to tred into that tougher conversation that I admit can make people anxious and nervous. It allows us to say: I see you. To be colorblind is to not see our race, and really that diminishes us.

SACRS Magazine: You told a story about being at the funeral of publisher John Johnson, the entrepreneur who started Ebony and Jet Magazines, and how that changed you.

MH: John Johnson was one of the most successful entrepreneurs of all time and I was listening to these amazing eulogies, given by amazing and accomplished people, each one better then the one before. And then American radio host Tom Joiner came up, the famous Black disc jockey, and he said: John Johnson was unapologetically Black. That concept was like cold water thrown on me. And I said to myself in that moment, that is what I want to be. I do not want to apologize for who I am, and I thought about all the times and ways that I had done that. In that moment, I owned my Blackness. This is what has given me courage to speak about race. I want people to know that I can work in an investment firm, and have a love of stock market investing, I can be an evangelist for financial literacy, and be Black, and be a woman, and be super comfortable in all of those roles.

State Association of County Retirement Systems

LEGISLATIVE REPORT

The Legislature met to convene the 2021-2022 session on Monday, December 7. The 2020 legislative session was probably the strangest on record, and that Monday's organizational session kept with the trend.

> *"While the 40-member Senate chose to convene in the Capitol, the 80-member Assembly convened several blocks away in the Golden One Center."*

Typically, the organizational session is a celebratory affair. In addition to formally electing the leadership, staff, and sergeants of the Senate and Assembly, new members are sworn in on the floors of their respective chambers. Family and loved ones are present, and new and returning members hold open office celebrations to mingle with each other and lobbyists.

By contrast, the opening day's ceremonies seemed more somber. Both Houses limited attendance to legislators and a minimum accompaniment of floor staff. The Capitol remained closed to most staff and lobbyists. While the 40-member Senate chose to convene in the Capitol, the 80-member Assembly convened several blocks away in the Golden One Center.

One thing that was consistent with previous organizational sessions was the glimpse into legislative priorities offered by comments on the floor and the first tranche of introduced bills.

The thorniest and most pressing issue facing the Governor and the Legislature relates to protections offered to residential tenants who have not paid rent. In August, the Legislature passed and the Governor signed AB 3088 (Chiu), which protected tenants from eviction as long as they paid part of the rent they owe through the beginning of February. Without an extension, tenants could face eviction beginning in February. On the other hand, if the Legislature

ignores the financial hardship the state's eviction moratoriums have imposed on landlords, much of the state's rental housing market could be threatened. Assemblymember David Chiu introduced legislation Monday to extend the eviction moratorium through the end of the year. Senator Anna Caballero introduced her own proposal, which would simply extend the protection through the end of March.

> *"Addressing the state's housing and homelessness crisis will continue to be an important issue."*

Addressing the state's housing and homelessness crisis will continue to be an important issue. As in recent years, we expect to see a number of proposals to force changes to zoning and density on local governments.

Employment and labor issues are always significant in the Legislature. Recent revelations of massive unemployment fraud and the genuine struggle of out of work Californians will likely fuel the Legislature's work in this area. While COVID-19 will help provide momentum to pro-employee bills, it is likely that legislators will take the opportunity to push for permanent changes in California law. For example, Assemblymember Evan Low introduced legislation that would require employers to provide employees 10 days of unpaid job-protected bereavement leave. While the potential loss of life due to COVID-19 will be cited as the impetus for the bill, employees would enjoy the 10-day bereavement in perpetuity if it passes.

The Legislature returned to Sacramento to begin session in earnest on January 4.

APPOINTMENTS

Governor Newsom has faced unanticipated and self-inflicted challenges throughout 2020. Interestingly, the opportunity to appoint a successor to fill Vice-President Elect Kamala Harris's Senate seat has become a political minefield. Advocates and legislators representing the state's African American, Latino, API, and LGBTQ Californians have all urged the Governor to appoint a Senator who can represent their communities. Many in Sacramento view Secretary of State Alex Padilla as the favorite candidate for the appointment. If appointed, Padilla would be the first Latino to represent California in the US Senate, despite the fact that 39% of the state's population identifies as Latino. However, his appointment would likely frustrate the other key constituencies noted above.

The President Elect may have given the Governor the opportunity to satisfy more stakeholders by announcing his intention to nominate Attorney General Xavier Becerra as his Health and Human Services Secretary. The Attorney General is arguably the second most important office after the Governorship. It is high profile and anybody in the position is within striking distance of the Governor's Office. The vacancy gives Governor Newsom another opportunity to advance somebody's political career. If he does choose to appoint Secretary Padilla to replace Harris, that would open the Secretary of State's office for appointment as well.

We will continue to keep you apprised of further developments as they unfold.

***Michael R. Robson** has worked since 1990 in California politics and has been lobbying since 2001 when he joined Edelstein, Gilbert, Robson & Smith LLC. Prior to joining the firm, he began a successful career with Senator Dede Alpert as a legislative aide soon after she was elected to the Assembly in 1990. He became staff director/chief of staff in 1998, while the Senator served in the position of Chair of the Senate Appropriations Committee. He is experienced in all public policy areas with particular expertise in environmental safety, utilities, revenue and taxation, local government finance, education, and the budget.*

***Trent E. Smith** worked for over 12 years in the State Capitol prior to joining the Edelstein, Gilbert, Robson & Smith LLC. He started his career in 1990 working for the well-respected late Senate Republican Leader Ken Maddy. He was later awarded one of 16 positions in the prestigious Senate Fellowship Program. Upon completion, he started working in various positions in the State Assembly. He worked as a Chief of Staff to Assembly Member Tom Woods of Redding and later to Orange County Assembly Member, Patricia Bates, who served as Vice Chair of the Assembly Appropriations Committee. In this position, he gained a unique and valuable knowledge of the State budget and related fiscal policy matters. In addition, he has extensive experience in numerous policy areas.*

***Bridget McGowan** joined Edelstein Gilbert Robson & Smith in 2018. Prior to joining the firm, she gained policy experience in the California State Assembly. Through internships in the district office of her local Assemblymember and later, in the office of the Chief Clerk, McGowan developed her knowledge of California's legislative process, rules and procedures. A graduate from UC Davis in 2018 with a Bachelor of Arts in International Relations, she is currently pursing a Master of Public Administration from the University of Southern California Price School of Public Policy.*

DIGITAL

CURRENCIES PRIMER

More than 6,700 different cryptocurrencies are traded publicly, according to CoinMarketCap.com, a market research website. Some people see cryptocurrencies as mere speculations, others as real investments. Whether they become the currency of the future remains to the seen, but in this part one of a two-part series, we provide a primer on cryptocurrency, blockchain, and bitcoin.

“Cryptocurrency is a digital method of exchange utilizing blockchain technology to facilitate peer-to-peer transactions in a decentralized manner.”

UNDERSTANDING CRYPTOCURRENCIES

Cryptocurrency is the broad category of internet-native methods of exchange popularized by the original cryptocurrency: Bitcoin. The defining feature of cryptocurrencies is their foundation of blockchain – the distributed ledger technology utilizing computer science and cryptography that allow for peer-to-peer transactions without a centralized authority or intermediary.

Units of cryptocurrency are held in individual digital wallets with unique wallet addresses, similar to an email address. Each wallet has a balance associated with it. Units of cryptocurrency can be transferred from one wallet to another, with the underlying blockchain maintaining the dynamic ledger that tracks each wallet balance. That blockchain is maintained and verified by a network of individual computers.

The blockchain that serves as the foundation for a cryptocurrency is based on open-source software, meaning that anyone can examine the underlying codebase that creates the system of the cryptocurrency’s operations. That codebase defines how many units of cryptocurrency are created, how they are created, how they are transferred from one wallet to another, and the cryptography employed to ensure the system is secure. A cryptocurrency’s codebase must ensure that the same unit of cryptocurrency cannot be transferred twice at the same time by different wallets, referred to as “the double spend problem.” Solving the double spend problem without a centralized authority or intermediary is a primary feature of a cryptocurrency.

Units of cryptocurrency are transferred among wallets. Wallet account balances are kept secure, through the established cryptographic technique of public/private key signatures. Each wallet has an associated unique public key and private key, which are strings of random digits. The public key of a wallet is publicly viewable, similar to an email address. The private key acts as a digital signature, or a password, to the wallet that must be input before units of cryptocurrency can leave that wallet. In that way, access to a wallet’s private key is mandatory in order to sendcryptocurrency from that wallet to another. Once a transaction to move units of a cryptocurrency from one wallet to another is initiated by inputting the private key, computers running the blockchain network software verify this transaction and update the ledger to reflect the change in account balances. These changes are irreversible – an important distinction of cryptocurrencies.

Some cryptocurrencies may be better suited for certain use cases than others, depending on the types of computer science, cryptography, and system design features chosen for a particular cryptocurrency. A series of commonly accepted tradeoffs exist when choosing these features for a given currency; this set of tradeoffs is referred to as the “scalability trilemma” balancing (1) how fast, (2) how secure and (3) how decentralized a cryptocurrency’s underlying blockchain is in its operation. For example, if a blockchain only had to coordinate transactions across two computers, it could verify those transactions very quickly – many thousands per second. However, this configuration would not be very decentralized. While there is innovative work being done to expand the outer limits of the scalability trilemma, the current boundaries of tradeoffs are generally accepted and planned for at this point.

Before Bitcoin, there were several attempts at creating cryptographic electronic money, including “Digicash” in 1995 and “b-money” and “bit gold” in 1998. However, Bitcoin’s predecessors failed in their attempt to solve the double spend problem in a decentralized, trustless manner. Since Bitcoin’s launch in 2009, thousands of alternative digital currencies, or “Altcoins” have been launched, with varying degrees of success. While the broad description of cryptocurrencies detailed above generally holds true for Altcoins, Altcoins have unique differences among them in their intended use cases and specifics around how each system’s software operates. Different cryptocurrencies may use different types of cryptography or different methods of communication between computers running the blockchain software. Despite the creation of thousands of Altcoins, Bitcoin remains the most valuable and widely used cryptocurrency in existence.

“Bitcoin is a non-sovereign, hard-capped supply, global, immutable, decentralized, digital store of value.”

MORE ABOUT BITCOIN

Bitcoin is the largest and most widely used cryptocurrency. It is a decentralized digital currency that operates on the peer-to-peer Bitcoin network without any central governing authority or trusted intermediary.

The Bitcoin whitepaper, detailing how Bitcoin works, was released October 31, 2008 by the pseudonymous author Satoshi Nakamoto. The Bitcoin blockchain began operating on January 3, 2009 and has been operational 99.98% of the time since then, making this blockchain the most reliable financial transaction network in history.

The Bitcoin network is software that runs the Bitcoin blockchain, allowing for Bitcoin to be transferred from wallet to wallet safely and securely utilizing cryptography and computer science. These various transactions – where Tom sends Jack some Bitcoin, Jill sends Sam some Bitcoin, and so on – are aggregated into a queue every ~10 minutes. While these transactions are being queued, hundreds of thousands of specialized computer processors around the world race to guess a random number out of an incredibly large set of potential numbers (called a "nonce") utilizing established cryptography. By correctly guessing the nonce, the accuracy and timeliness of the transactions in the queue are verified. Once verified, the transfers from wallet to wallet are added to the ledger. After that math problem is solved, the queue and the race start over again. The Bitcoin network has been doing this exact process over and over since January 3, 2009.

The random processor that solves the cryptographic math problem is rewarded by receiving newly-created Bitcoin, which is called the block reward or "coin base." The current block reward is 6.25 Bitcoin, and every four years this block reward is reduced by half. (The next reduction, to 3.125, is scheduled for 2024). The block reward is how new Bitcoin are created. As of January 2020, there were 18.2 million Bitcoin in existence. There will only ever be 21 million Bitcoin created. By 2140, all 21 million Bitcoin will have been created and awarded, and there will be no more new Bitcoin created.

> "Blockchain is a cryptographically-secure, distributed database of timestamped records operating on a peer-to-peer computer network."

The operations of the Bitcoin network are executed via open-source software, and *every transaction in Bitcoin's history is public*. The history of transactions is kept track of by tens of thousands of computers all over the world running the Bitcoin software. This is analogous having read-only access to a Google Sheet. The Bitcoin network operates in a trustless, permissionless manner – meaning there is no central authority controlling it, and bad actors cannot prevent the network from operating as intended. Bitcoin's successful implementation of this trustless and permissionless network is, at its core, its most revolutionary innovation.

Timeline of Bitcoin Development

For the first several years of Bitcoin's history, it was a computer science experiment that existed in relative obscurity, with only a few hundred enthusiasts paying attention to it. Silk Road, the digital black market platform, was launched in 2011 and utilized Bitcoin as a payment method. As Silk Road grew in popularity, so did Bitcoin.

Silk Road was shut down in late 2013, and in early 2014 Mt Gox, the leading Bitcoin exchange at the time, was hacked and 850,000 Bitcoin were stolen. This sent Bitcoin into a two-year bear market before price began recovering in late 2015 and accelerating through 2016. During that time, software developers continued to build on and improve the Bitcoin network, and more businesses were created around the Bitcoin ecosystem. This progress set the stage for Bitcoin's explosion in 2017, when network activity grew parabolically, and price increased more than 1,300%.

Over 2018–2019, Bitcoin investing became significantly more institutionalized. The CME, CBOE and NYSE all launched regulated Bitcoin futures products. Bitcoin investment trusts grew in popularity. Regulators in both the US and abroad provided additional clarity on the implications of investing and transacting in Bitcoin. Reputable banks began providing banking services to Bitcoin companies. Several qualified custodians, including Fidelity, began providing Bitcoin custodial services.

MORE ABOUT BLOCKCHAIN

Blockchain is the distributed ledger technology first created as the foundation for Bitcoin, but since adopted for many other use cases. At its core, blockchain is a decentralized network; it is not controlled by a central party, but by many parties acting in concert with one another. Blockchain combines established computer science and cryptography to immutably store records without a centralized authority via software code. The database of records is shared and synchronized across multiple

computers, with each party owning an identical copy of the database that is automatically updated in real-time as any new records are added.

The blockchain gets its name from the "blocks" of records that are batched together and verified via established cryptographic algorithms within the computers that are running the network's software. Once those records are agreed upon by the computers, they are added onto the "chain" of existing blocks that retain all prior record changes and are connected by established cryptography. Simply put: blockchain is a chain of blocks filled with records.

Cryptography, or secure communication, has been around in various forms since the ancient Egyptians and is ubiquitous in our daily lives. The cryptography underpinning blockchains have mostly been around for decades. At the core of this cryptography is the "hash" function. Hashing allows for a string of text of any length (input) to be translated into a string of text of a predetermined, defined length (output). Different types of hashing algorithms exist, with Bitcoin utilizing a hashing algorithm called SHA-256. In the Bitcoin blockchain, a series of transactions are taken as the input and translated via the algorithm into a 64-character output string. You could even use SHA-256 to hash the entire text of the Bible, for example, into a 64-character output string.

Blockchains then tie together blocks of records utilizing these hashes along with a data organization method called "Merkle Trees." Utilizing this computer science and cryptography allows for the underlying records of a blockchain to be mathematically proven to be accurate and secure. While that process may sound simple, it is actually revolutionary.

Types of Blockchain

Blockchains can be considered either permissioned or permissionless.

Permissioned blockchains control who can see the blockchain records and who can submit changes to it. Computers running a permissioned blockchain are assumed to be good actors and do not require economic incentives (like new Bitcoin paid to Bitcoin miners) to verify new records added to the blockchain. Corporations may use permissioned blockchains to share information with each other quickly, cheaply, securely and accurately.

Permissionless blockchains allow anyone to see and add records to the Blockchain, as long as they follow the consensus rules of the network. Bitcoin, for example, is a permissionless blockchain. Computers running permissionless blockchains are not assumed to be good actors – and their design allows for the network to be attacked maliciously and still not fail. In computer science terminology, this is called Byzantine fault tolerant. In order to compel computers that may not be good actors to verify new blocks, economic incentives are rewarded via the software running the blockchain. This is how the Bitcoin blockchain verifies transactions in a trustless, permissionless manner.

Uses of Blockchain

As a rule of thumb, any instance where a middleman is earning significant profit simply for acting as a trusted third party is likely a potential opportunity for blockchain to do the job more cheaply and efficiently. Different types of blockchains are being employed for dozens of different use cases, including banking, finance and capital markets, location tracking, supply chain, digital identity, cloud storage and computing, Internet of Things (IoT), energy, government, accounting, voting, prediction markets, healthcare, international trade, insurance, real estate; law, and media and entertainment.

Each of these use cases employ blockchain for various reasons. There are many advantages to using a blockchain versus a traditional database, including:

1. simultaneous agreement across nodes
2. cryptographically secure
3. transparent, to the degree desired
4. fully traceable and auditable
5. few or no trusted intermediaries

Private, permissioned blockchains are simply a superior type of database that's useful for many types of recordkeeping. They are an innovative *evolution* of database technology utilizing computer science and cryptography. Public, permissionless blockchains, when coupled with value-accruing crypto assets that are utilized on the blockchains, are an entirely new form of decentralized information technology with radical implications about how the future could look at its most foundational levels. They have the potential to be a *revolution*.

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CONVERGENCE:

5 Growth Themes Shaping the Future

The world is rapidly changing: Enabling technologies are becoming less expensive and more powerful, innovative business models are capturing growing markets by offering value-added products and services, and in turn, societal norms are evolving in response.

But what does it mean for investors and how does it affect our investment mindset?

We wanted to know, so during the summer of 2020 our team undertook an ambitious and extensive effort to forecast important drivers of end-market, industry, and corporate profit growth—essentially, to create a growth investor's roadmap for the next decade.

As active investors, we have always believed that taking a step back from our day-to-day activities and thinking more broadly about the future is essential. But the year 2020 provided even more inspiration. It signified the beginning of a new decade, which is always a good time for forecasts. COVID-19 further inspired introspection as we asked ourselves how the world would change as we exit the pandemic. Taking a break from the daily news provided some relief and also allowed us to have some fun.

Predicting the Future—Essential to Active Investing

As active growth investors, we seek to analyze the future to predict outcomes in a way other investment approaches cannot.

We are ultimately betting against the very powerful reality of mean reversion. The adage that "the more things change, the more they may stay the same" is powerful, and is often true. But in reality things do change. Consumer behaviors evolve. Humans innovate and create new solutions. Corporate profit pools shift. And new winners emerge. Just think about some of the things the world was predicting at the turn of the last decade.

In 2010, Gartner predicted that by 2014, not even halfway through the decade, global mobile phone penetration would be 90%; today it is only around 72%.

Meanwhile, in 2011 International Data Corporation (IDC) predicted mobile gaming industry revenue would reach $9 billion in 2015; it actually reached $34 billion, and is now $77 billion.

And back in 2010, who really understood the businesses models the internet would enable? The first Uber ride was taken in San Francisco in July 2010; today, Uber has a market cap of $59 billion. And remember when we thought Napster would destroy the music industry by eliminating artists' incentives? The adoption of subscription business models drove a different outcome, and Spotify now has 286 million subscribers and revenue of greater than $7 billion.

The point is, as Niels Bohr, father of the atomic model, said, "Prediction is very difficult, especially if it's about the future."

For now, the ability to predict changes is still the domain of humans. It is our job, then, to develop a practice of forecasting, which involves observing, learning, and anticipating the future. With that in mind, here are five themes we expect will gain the attention of investors in the decade to come.

THEME 1: EditGenetics

McKinsey refers to a trend it calls "synthetic biology," which is essentially the merging of science and big data. This can be seen across diverse fields, such as medicine, biofuels, agriculture, food/nutrition, and even cosmetics.

In medicine, we seem to be at a tipping point, driven by genome sequencing and modularizing pieces of DNA. Research and development (R&D) funding has increased significantly since 2015, and we believe commercial breakthroughs are imminent.

The environmental, social, and governance (ESG) implications are massive, both good (think about renewable resources) and bad (think about the ethics of playing God).

THEME 2: Conservation Capitalism—Doing More with Less

Buildings consume 40% of all global energy, but every year energy regulations get a bit stricter (around 2% stricter, by some estimates). This forces continuous innovation.

Technology gains within industrial applications are delivering improvements in areas such as construction materials, HVAC systems, elevators, and security systems. New business models are also helping drive these changes via testing, inspection, and certification—compliance as a service, for example.

And smart buildings are only the beginning. Efficiency gains have also been made via smart grids and smart cities (everything is getting smart these days).

Combined with other trends—a growing middle class, urbanization, and climate change—this is a long-term, stable growth trend ripe with disruption potential.

Once again, the ESG implications are significant, as ESG awareness could lead to a more accurate pricing of negative externalities, creating bigger total addressable markets (TAMs) for solution providers.

> *"We see factory automation as major growth area, with vision, sensors and measurement, and industrial software, in particular, accelerating (partly due to COVID-19). We also expect a shift to "as-a-service" business models across industries."*

THEME 3: Factory as a Service—The Future of Manufacturing

There are massive benefits to a fully digitalized factory, which includes robots, cobots (collaborative robots designed for direct human-robot interaction), and full connectivity via a localized internet of things (IoT).

Consider the implications for real-time asset monitoring, accuracy and precision, and inventory management, for example. And from a customer point of view, a fully digitalized factory creates a new way of personalizing products.

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> *"Or, consider the Peloton phenomena. In the past, nothing beat the social aspect of group exercise. Today, you can spin in your basement, and the experience is even better thanks to data and connectivity. Peloton is gamifying fitness."*

THEME 4: From Snowcrash to Fortnite and Beyond—Exploring the Metaverse

Applying gaming techniques more broadly—the gamification of everything—is just one illustration of the rapidly changing consumer experience landscape, due in large part to digitization at scale.

The key here is connections—between brand and consumer, between consumers and their networks. It's the idea of nudges, badges, and tokens, which dates back a century, but it's different now.

One Chinese company, for example, encourages interaction by lowering costs for users who share goods or services they like with their online networks.

Or, consider the Peloton phenomena. In the past, nothing beat the social aspect of group exercise. Today, you can spin in your basement, and the experience is even better thanks to data and connectivity. Peloton is gamifying fitness.

While today's digital world might imply fewer personal connections (as parents of teens can attest), in reality digital networks are even more powerful than ever—and they are changing relationships between brands, merchants, and consumers.

THEME 5: Connected Commerce

Here we think about the infrastructure on which digital services can thrive, such as payment ecosystems and digital currencies.

Digital business models often start as support infrastructure, at least in emerging markets. Alipay, for example, began as a third-party mobile and online payment platform, and now averages 731 million monthly users and had payment volume of $17 trillion in 2019 (compared to $8.7 trillion for Visa and $4.7 trillion for Mastercard).

But companies in this space keep adding services, and thereby enter a virtuous feedback loop. Think about how digital payments are driving financial inclusion, for example.

Our Vision

Over the coming months our global research analysts will discuss these themes in detail—on our podcast and in our blog. For now, however, we wanted to provide a glimpse of what we will be discussing.

We're not suggesting we always get predictions right; rather, if we have a discipline around predicting, we are more likely to get more right. The discipline of forecasting is necessary to create a framework for understanding the world and predicting the future in a highly systematic and iterative way. Only in this way can we decrease the variability around predicted outcomes, improve accuracy, and act on investment ideas earlier and with greater conviction.

And as active growth investors, we believe we have an advantage, as noted above—our ability to analyze the future to predict outcomes in a way the other investment approaches cannot.

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FALL 2021

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Loews Hollywood Hotel
Hollywood, CA

SPRING 2022

May 10-13
Omni Rancho Las Palmas Resort & Spa
Rancho Mirage, CA

FALL 2022

November 8-11
Hyatt Regency Long Beach
Long Beach, CA

SPRING 2023

May 9-12
Paradise Point Resort & Spa
San Diego, CA

FALL 2023

November 5-11
Omni Rancho Las Palmas Resort & Spa
Rancho Mirage, CA