CARLYLE

January 2022

Global Insights

5 Questions for 2022

A year ago, it seemed that the only questions that animated investors involved vaccines: how many vials would be manufactured, distributed, and shot into arms in 2021? Knowledge of those statistics, it seemed, would be sufficient to predict financial market and economic outcomes. The virus had other ideas. The global peak in daily cases did not arrive until the pandemic's third year, after 9 billion vaccine doses had been administered.

Despite the pandemic's persistence, the global economy rebounded in 2021. Many businesses reported impressive earnings growth and financial markets were generally buoyant. The questions that seemed of such great consequence a year ago actually mattered very little to most investors' portfolios.

And yet, the longer the pandemic endures, the less "transitory" seem to be the changes in spending, working, and living that it has engendered. With few observers still entertaining the hope for a clear end date to COVID-19, the most critical questions today revolve around the ways households, businesses, and policymakers continue to adapt to these new realities.

1

Should Investors Beware of a Policy Boomerang?

In less than twelve months, U.S. economic policy has transitioned from an implicit embrace of "Modern Monetary Theory" to an environment where Members of Congress openly implore the Fed to tighten policy.[1] Inflation is unpopular and central bank-funded deficits have lost their appeal. Dramatic as this shift has been, the magnitude of the ultimate policy swing will depend on the course of the pandemic and the economy's response to its first taste of higher rates.

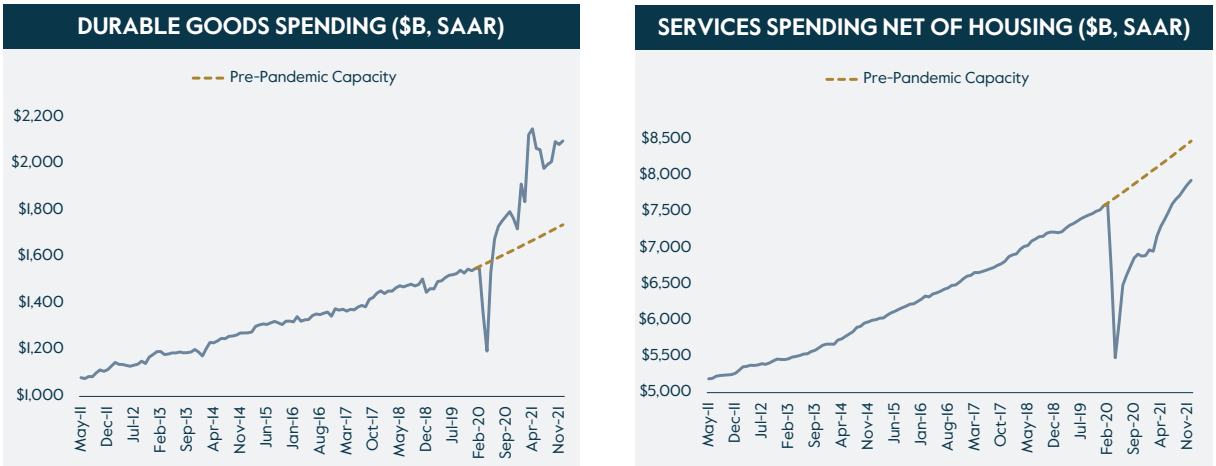
The 2021 inflation debate was not settled so much as mooted. Intensifying price pressures made "transitory" the biggest threat to the Fed's institutional credibility since "subprime is contained" nearly 15 years ago. So it was abandoned in favor of a new, hawkish rhetorical tilt that not only acknowledges the persistence of elevated inflation, but pledges to do something about it. Tapering was accelerated in December so that the first rate hike could come as soon as March. It seems more likely that the fed funds rate will finish 2022 at 1.25% than 0.1%, where it sits currently.

But the Fed never really abandoned its basic diagnosis. Unlike the "subprime" assessment, "transitory" looks to be more of a lexical rather than analytic error. It was the wrong word to use because it invited observers to see inflation through a temporal lens rather than focus on the underlying supply-demand imbalances that the Fed assumed would be temporary. Elevated inflation did not go away because neither did the pandemic.

Household spending is liquid in a way that the underlying economy is not. Money intended to be spent on a cruise or some other "experience" could instead buy a car, motorcycle, or camping equipment (Figure 1). But the unused cruise ship or event venue cannot be transformed magically into these other goods; the supply-side of the economy can only adjust over time through an increase in factories, equipment, trained workers, and cargo transportation and logistics network capacity. High prices are supposed to induce precisely this investment, but not if increased demand for goods or housing is thought to be temporarily boosted by pandemic-era restrictions and risk aversion.

1 C.f. Transcripts of Hearings November 30, 2021 and December 1, 2021 Before the U.S. Senate Banking Committee and the House Financial Services Committee.

Figure 1.
Pandemic-Induced Shift in Spending Relative to Underlying Capacity



Fiscal policy exacerbated these imbalances by supporting incomes and spending, often creating demand where there was no supply and contributing to the decline in labor force participation (and acute worker shortages). Most Congressional handicappers expected an additional $2 trillion to $3 trillion in federal spending would be signed into law by year-end 2021, but elevated inflation complicated passage. Instead, the U.S. is now set for the largest fiscal consolidation since the 1940s, with the U.S. federal deficit set to shrink by 8% of GDP. Globally, fiscal policy could tighten by 3% of GDP this year.[2] Fiscal consolidation may slow real growth, but should also reduce labor market distortions and price pressures.

Broad economic reopening was always inflation's cure rather than its cause. The "transitory" debate muddled this picture by mistakenly implying that pent-up demand for flights and hotel rooms was the problem. "Reopening" eases price pressures by realigning demand with the economy's underlying productive capacity. If risk aversion and restrictions cause services consumption to finish the year well below pre-pandemic trends, the scale of tightening required to bring inflation to heel may surprise some observers. With the supply-side of the economy unable to transmogrify to match new spending patterns, the Fed may have to resort to old-fashioned demand destruction.

2 This is based on the IMF estimate of the change in the structural deficits. IMF, October 2021 WEO Database.
Figure 1. Source: Carlyle Analysis; St. Louis Federal Reserve, January 2022. There can be no assurance these market conditions will continue to be achieved.

2

Who Will Emerge as the Winners of Digital Transformation?

Technological revolutions are not spurred by the advent of new technology so much as by its adoption. It's often difficult for prospective customers to understand why they need a novel product or service, and the more revolutionary the innovation, the harder it can be to understand its potential value. Many great technologies have been undone as investments by exorbitant "customer acquisition costs."

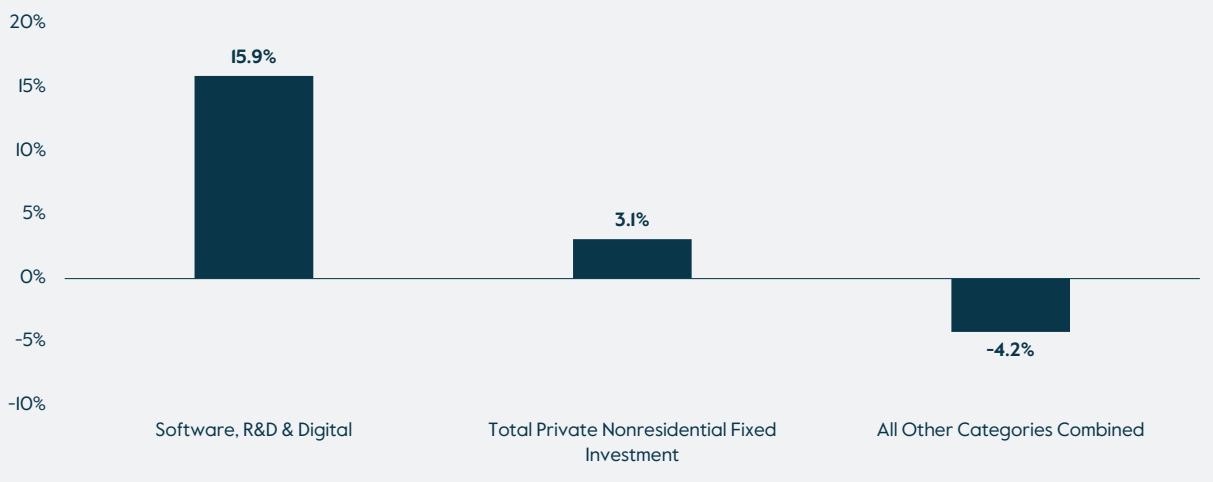
Mobile telephony was first developed in the 1960s. As late as 1980, total penetration was expected to cap out at 0.5% of the market, or less than 1 million phones. There are currently 14.9 billion handsets in use globally.[3] As telecom analyst Jonathan Pelson explains, these projections were so flawed because they were based on interviews of prospective consumers regarding a technology whose ultimate uses they couldn't possibly imagine.[4] Survey respondents of the early 1980s could be forgiven for not seeing much value in expensive, brick-sized devices typically found in the backseats of Cadillac Fleetwood Broughams.

By providing a sudden glimpse of a digitized, virtual future, the pandemic was the rare event that allowed people to conceive of the transformational potential of new technology. It was as though the copper wire telephony network suddenly failed and people had to resort to cell phones.

This experience has opened eyes to the potential for faster growth, wider margins, but also more fierce competition. When asked for the top risks to their business in 2022, CEOs cite the technological change unleashed by the pandemic 15x more frequently than the pandemic itself.[5] And they have put their money where their mouth is: spending on software, data, digital, and related R&D has grown 15.9% in real terms while all other business investment has declined by -4.2% since 2019 (Figure 2). These trends seem likely to accelerate in 2022 as acute worker shortages increase the allure of labor-saving software able to automate workflows and tasks.

3 Statistica, January 2022.
4 Pelson, J. (2021). *Wireless Wars*. Dallas: BenBella Books.
5 AlixPartners, Survey Conducted December 2021.

Figure 2.
Cumulative Real Business Investment Growth



While this bodes very well for the tech sector, and especially the revenues of those businesses operating at the frontier of data and digital services, it's important to remember that periods of rapid B2B tech adoption only occur when other businesses see significant value in adopting those new products or services. And, if the past is any guide, the returns to investments that treat "technology" as an input could exceed the returns to "technology" as a sector.

This is the lesson from the U.S. "productivity miracle" of the late-1990s. By ramping up spending on computers, wireless barcode scanners, and inventory software systems, businesses in the retail and manufacturing sectors were able to match production to sales, automate the flow of goods, and streamline logistics networks and production processes.[6] In the 10-years following this investment boom (Figure 3), durable goods inventories declined by 20% relative to sales, related labor productivity increased by 57%, and the stock market returns of the retail and manufacturing sectors outperformed those of tech by 16% and 19%, respectively (Figure 4).

In other words, information and communications technology facilitated that revolution, but its ultimate winners were the *adopters* of that technology. Something similar could be at work today.

6 "US Productivity Growth, 1995-2000: Understanding the contribution of Information Technology relative to other factors," McKinsey Global Institute, 2001.
Figure 2. Source: Carlyle, BEA, December 2021. There is no guarantee any trends will continue.

Figure 3.
Tech Investments Drive Manufacturing & Retail Profitability

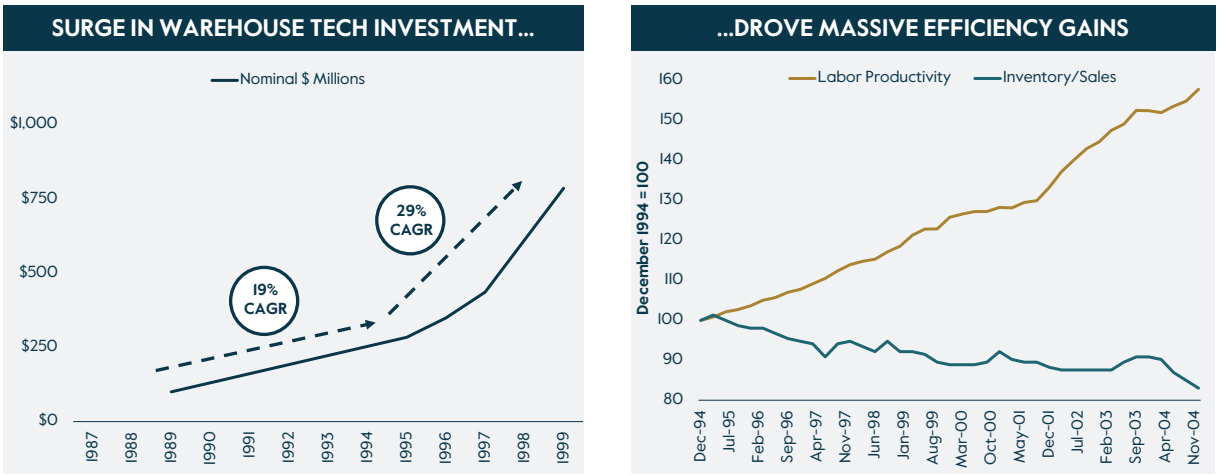


Figure 4.
Adopters of New Technology Outperform its Providers

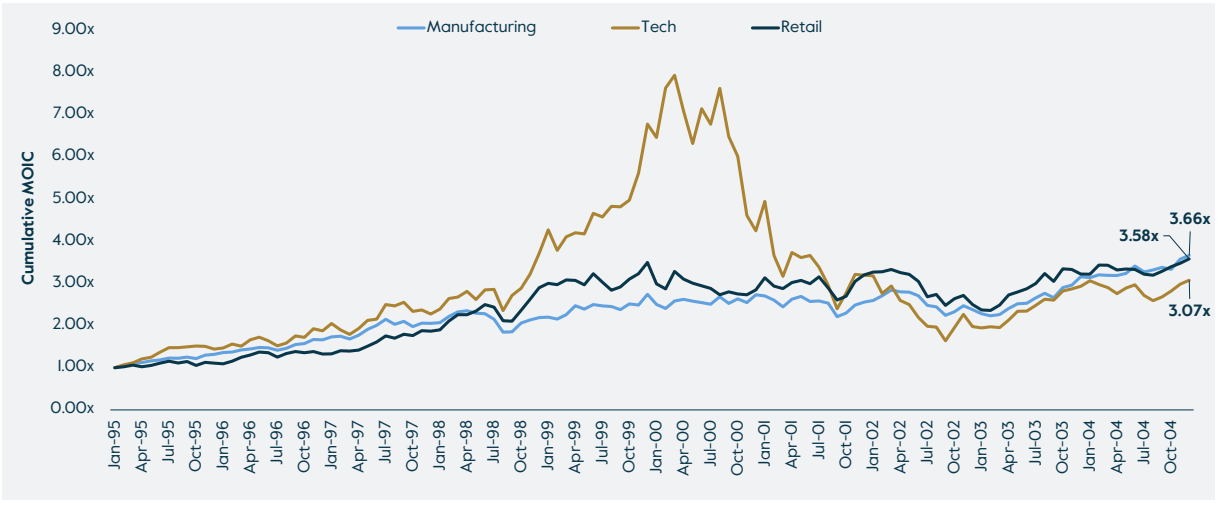


Figure 3. Source: McKinsey Global Institute; Carlyle Analysis; Bureau of Labor Statistics; Bureau of Economic Analysis.
Figure 4. Source: Carlyle Analysis; CRSP Database, December 2021.

3

Can Tech Valuations Mistake Form for Substance?

Valuations are high on average, but it's really the prices paid for the top 10% to 20% of businesses that are most out-of-line with historic averages. Value spreads – the valuation gap between the most expensive and cheapest fifth of companies – have reached all-time highs and currently sit over three standard deviations from historic averages (99th percentile of the distribution; Figure 5). Before assuming that these valuations must come down, it's worth considering an alternative hypothesis: historic data are of little value as a guide to contemporary asset pricing.

Many of the businesses in the top fifth of the distribution are digital platforms operating in software, data analytics, life sciences, artificial intelligence, and clean energy that not only offer the promise of rapid growth, but costs that are largely fixed, intangible, and incurred up front so that operating margins swing massively into the black beyond some revenue threshold. No surprise such businesses would be priced at multiples far beyond those observed historically; their economics allow operating cash flow to scale at rates not seen in the sample.

In the industrial era, "growth" was constrained by physical realities – the need to hire more workers, buy more equipment, build more factories, and expand distribution networks. Network effects and intangible assets (human capital, proprietary technology, etc.) were far less consequential to

Figure 5.
"Value Spreads" Rise to Record Highs

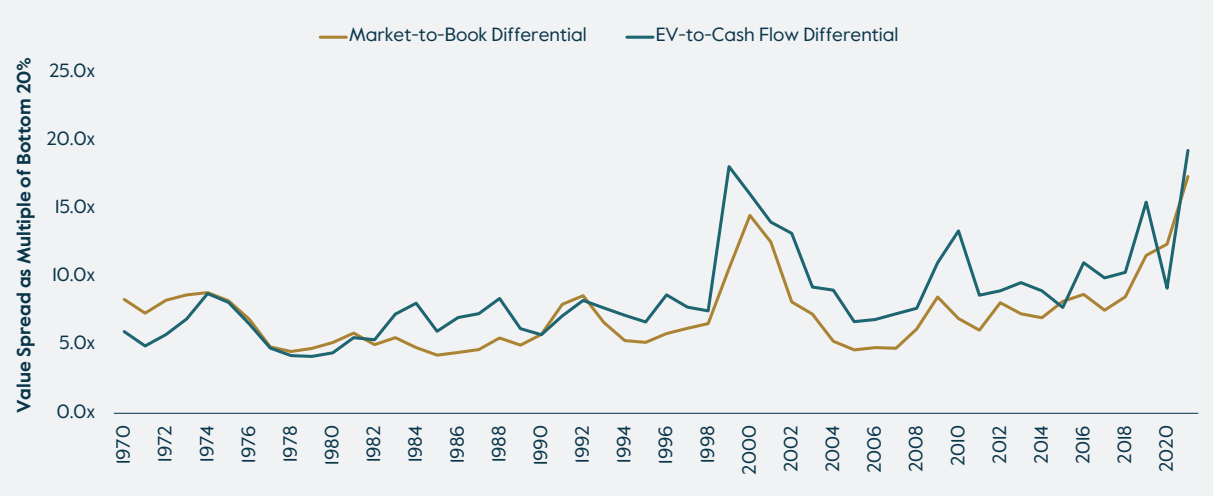


Figure 5. Source: Carlyle Analysis; CRSP Database. There is no guarantee any trends will continue.

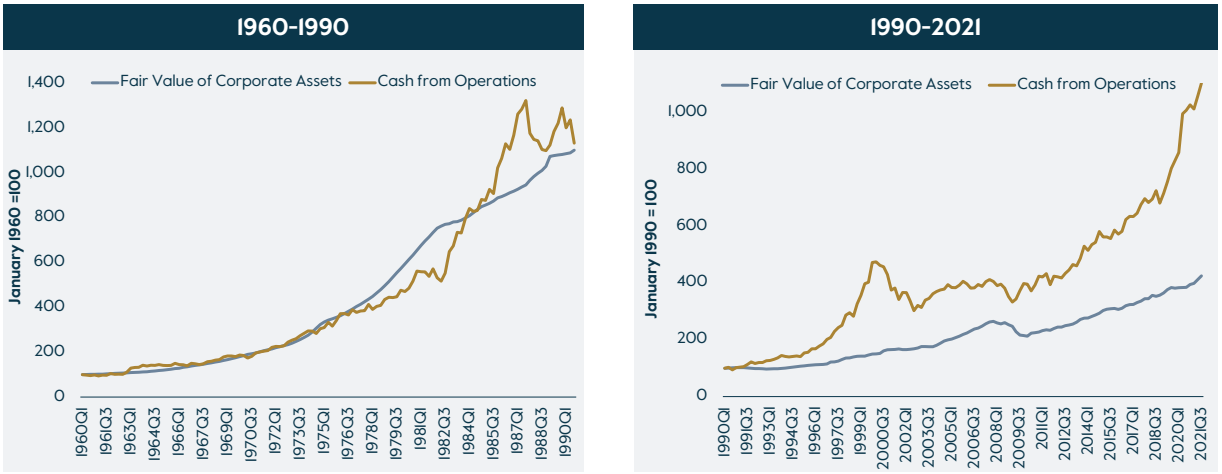
company prospects,[7] and operating leverage was largely a function of property, plant, and equipment. Future growth, if it materialized, also implied significant future costs, limiting the extent to which company valuations could *rationally* depart from historic and cross-sectional averages.

For digital businesses producing infinitely reproducible software, content, data, biologics, etc., these constraints no longer bind. Between 1960 and 1990, U.S. corporate cash flow rose proportionally with the book value of corporate assets; industrial age growth required a commensurate increase in fixed investment (and related employment). But since 1990 – and especially in the years since the Global Financial Crisis – corporate cash flow has become disconnected from physical assets (Figure 6). Today, the largest, most mature digital businesses often generate 5x as much cash from operations as they invest (Table I), as returns accrue to intangible capital already-in-place (Figure 7).

It is one thing to say today's valuations can be rationalized. It's another to say the valuations of each of the businesses in the top fifth of the distribution are entirely rational. Underwriting tends towards "rules of thumb," where valuations become the product of some agreed upon metric (sales or EBITDA) and a prevailing multiple, often determined on the basis of some basket of comparable businesses. It is the construction of this basket of "comps," which can be unduly focused on sector rather than company-specific factors, where most of the mistakes seem likely to be made.

It is not the sector in which a firm operates that determines its equilibrium value, but the mechanics of its growth. Companies that make physical products and whose intangible assets mostly consist of brand rather than software or proprietary technology are not likely to exhibit the per-unit economics necessary to warrant such lofty valuations. While higher interest rates may take some of the froth out of growth valuations given their dependence on terminal values,[8] the real carnage, should it arrive, will be the valuations of those companies priced as digital platforms even while facing industrial-era physical constraints.

Figure 6.
Changes in Scalability as Cash Rises Faster than Tangible Assets



7 C.f. citations in "When the Future Arrives Early," The Carlyle Group, September 2020.
8 C.f. "Ascending with Waxed Wings," The Carlyle Group, September 2021.
Figure 6. Source: Carlyle Analysis; Federal Reserve Flow of Funds Data. There is no guarantee any trends will continue.

Table 1.
Net Cash Flow Positions of Largest U.S.-Listed Businesses

	OPERATING INCOME (USD Thousands)*	CAPITAL EXPENDITURES (USD Thousands)*	INTERNAL CASH/CAPEX Coverage Ratio
Saudi Aramco	166,887,625	31,249,000	5.3x
Apple	77,516,250	10,550,500	7.3x
Berkshire Hathaway	74,230,000	14,067,000	5.3x
Microsoft	50,223,000	15,405,000	3.3x
Alphabet	45,695,250	23,676,000	1.9x
Meta	33,378,250	15,485,750	2.2x
Amazon	19,504,000	31,842,250	0.6x
TSMC	16,959,675	17,156,475	1.0x
NVIDIA	3,598,000	702,500	5.1x
Tesla	1,591,000	3,586,750	0.4x
Weighted Average			**4.5x**

*Four-Year Average

Figure 7.
Six MegaCap Businesses Account for 25% of S&P Returns

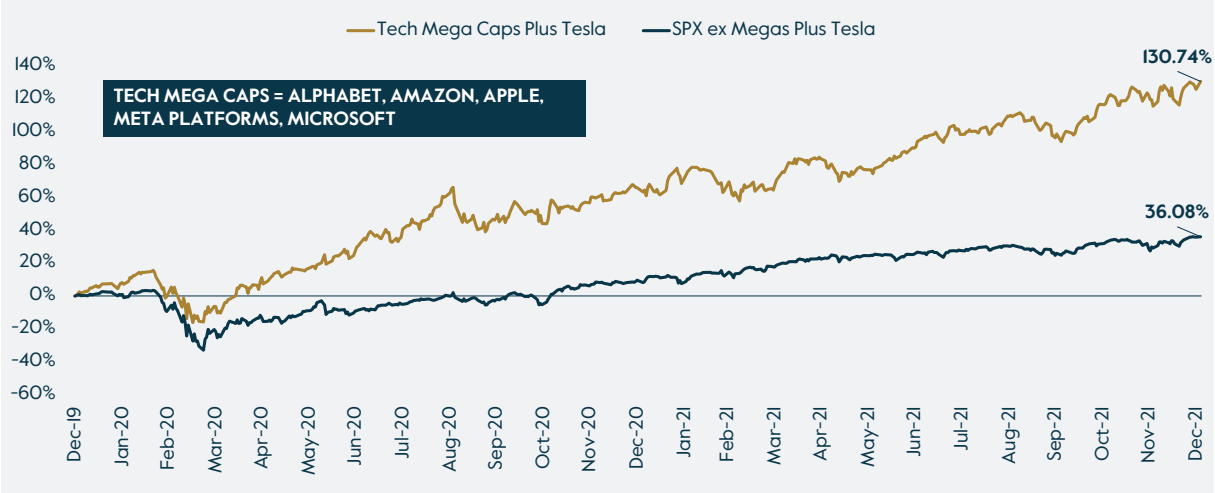


Table I. Source: Carlyle; Yahoo! Finance, Capital IQ, January 5, 2022. There can be no assurance these market conditions will continue to be achieved.
Figure 7. Source: Carlyle, S&P Capital IQ, January 4, 2021. There is no guarantee any trends will continue.

4

How Temporary is China's Deceleration?

In the second half of 2021, the Chinese economy slowed to a pace that was not only some distance from the 8% to 10% annualized rate of the past two decades but also well below the implicit 5% target of the 14th Five Year Plan (2021-25).[9] The slowdown comes in the context of rising geopolitical tensions with the U.S. and tightening regulations in the tech sector, leading some investors to imbue soft data with additional meaning.

Despite worries about "decoupling," trade – especially with the U.S. – has been a bright spot for the Chinese economy. Exports to the U.S. surged in 2021, rising 15% above prior peaks and pushing China's bilateral trade surplus to new records despite ongoing tariffs (Figure 8). The shift in consumption from "experiences" to goods has been of great benefit to China, which is home to seven of the ten busiest ports in the world and whose infrastructure handles more than half of global merchandise trade.[10] Cargo throughput volumes in China far exceed 2019 levels (Figure 9).

"Decoupling" has been observed in the technology sector, where the U.S. and China seem to have entered an era of "strategic competition."[11] The U.S. (10) and China (8) are home to 18 of the world's 20 largest internet platforms by revenue and are the top ranked economies in terms of knowledge workers, patents, high-tech exports, intangible assets and commercial R&D.[12] There is little evidence of any slowdown here; growth remains a strategic priority. Regulatory incursions have mainly served to increase risk premia and depress Chinese tech valuations relative to those of comparable U.S. businesses (Figure 10).

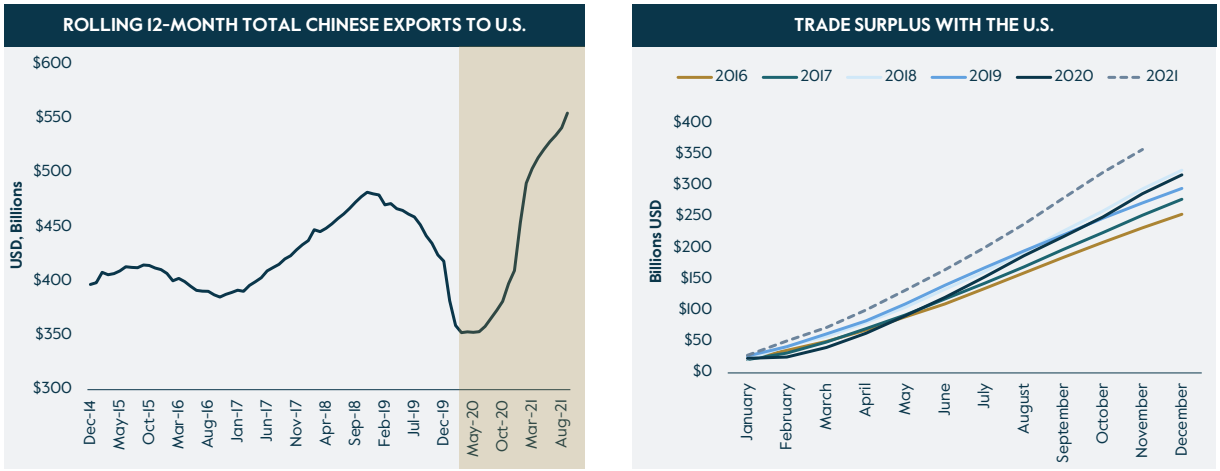
Growth slowed mainly due to (1) uneven consumption growth resulting from China's "zero Covid" policy, which required a number of cities to institute mass testing regiments and lockdowns whenever an outbreak of cases was identified;[13] and (2) a sharp decline in real estate development (Figure 11). While there is little reason to suspect the consumption slowdown is structural, that's not the case for the property market where policymakers seem intent on wringing excessive leverage and speculation from the system.

9 Carlyle Analysis of Portfolio Company data; National Bureau of Statistics. January 2022.
10 World Shipping Council, November 2021.
11 Wu, X. (2020), "Technology, power, and uncontrolled great power strategic competition between China and the United States," *China International Strategy Review.*
12 The Global Innovation Index (GII) 2020.
13 C.f. "Why China is still trying to achieve zero Covid," BBC News, November 15, 2021.

Residential development rose to an unsustainably large share of GDP over the past twenty years, mainly to accommodate the 440 million people that migrated from rural areas to cities.[14] Analysts expect residential investment's contribution to GDP to fall by about half over the next several years as policymakers focus on slower but higher quality growth.[15] Necessary as it may be, shrinking residential development's share of the economy creates near-term risks due to the high debt loads of property development groups, as well as all of the downstream activity supported by such investment.[16]

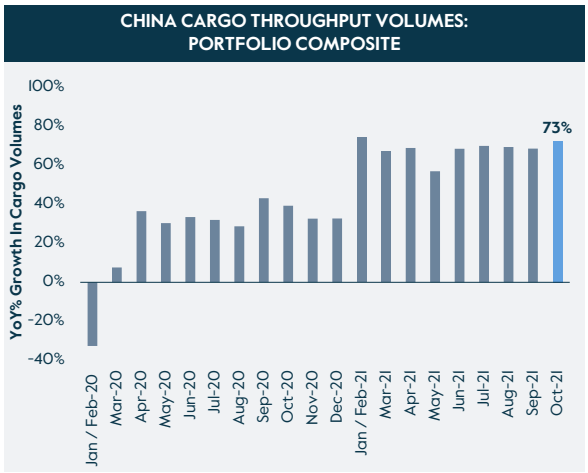
Despite these risks, it's worth remembering that in the Chinese economic system, economic growth often functions as social insurance (Figure 12). The "common prosperity" agenda aims to strengthen the safety net, but its main thrust is to boost middle class incomes so as to accelerate the transition to consumption-led growth and double GDP per capita.[17] The U.S. may have a "Fed put" on asset prices, but in China it is growth rates that have rarely been allowed to remain below certain thresholds.

Figure 8.
China's Exports & Bilateral Surplus Surge in 2021



14 Carlyle Analysis. World Bank, World Development Indicators Database. Kam Wing Chan, "Internal Migration in China: Integrating Migration with Urbanization Policies and Hukou Reform," November 2021.
15 Ding Ding and Weicheng Lian (IMF). "The Long-Run Trend of Residential Investment in China," Vox, 2019.
16 Rogoff, K. and Y. Yang. (2020), "Peak Housing," NBER Working Paper No. 27697.
17 China's 14th Five-Year Plan (2021-2025) Report, April 1, 2021.
Figure 8. Source: Carlyle, IMF DOTS; Bloomberg; China General Administration of Customs; January 2022.

Figure 9.
Surge in China Cargo Throughput Volumes



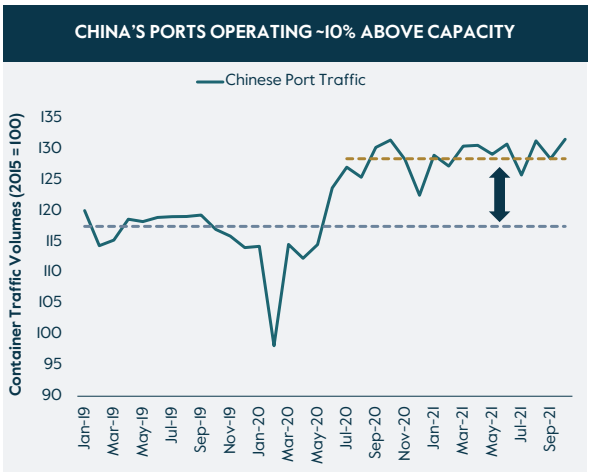


Figure 10.
China Tech Cheapens to that of the U.S.

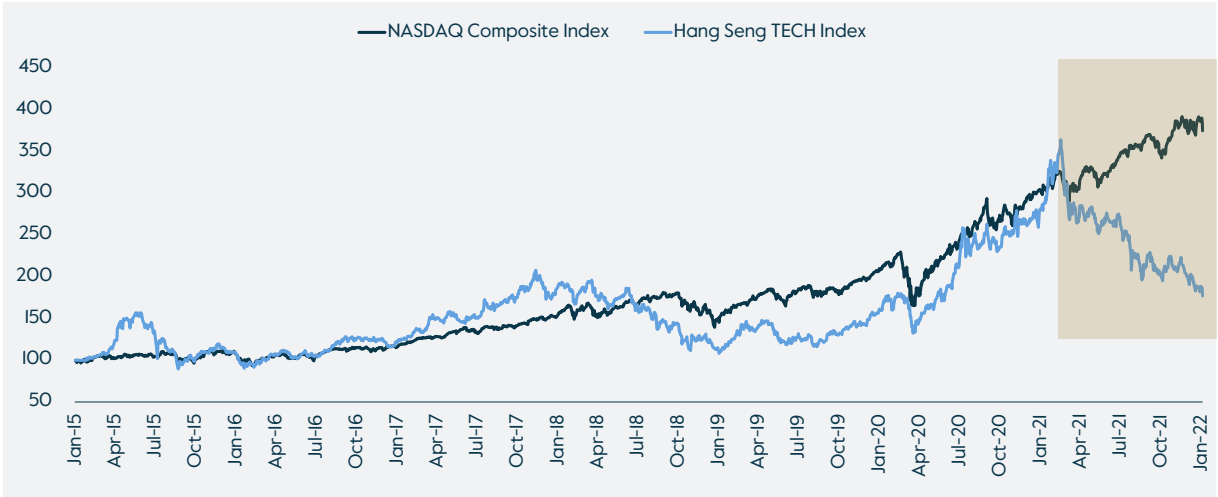
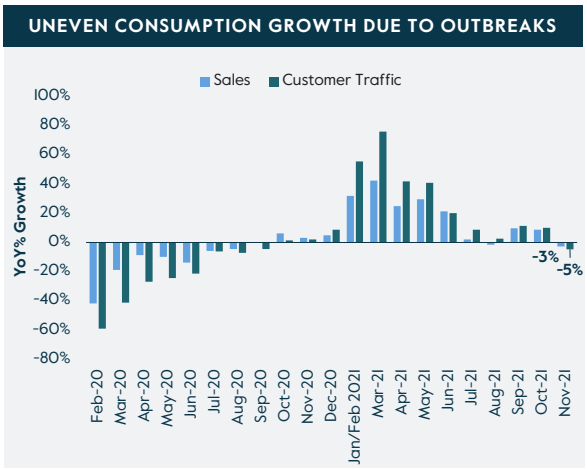


Figure 9. Source: Carlyle Analysis of Portfolio Company Data; RWI; January 2022.
Figure 10. Source: Carlyle; Bloomberg; There is no guarantee these trends will continue.

Figure 11.
Slowdown Tied to Lockdowns, Real Estate Correction



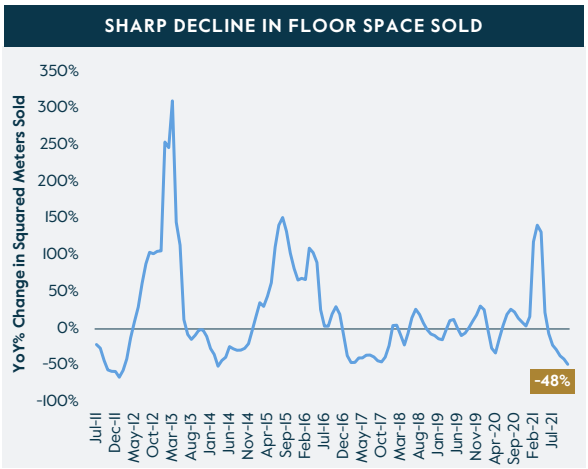


Figure 12.
China Meets its Social Obligations Through its Commitment to Growth

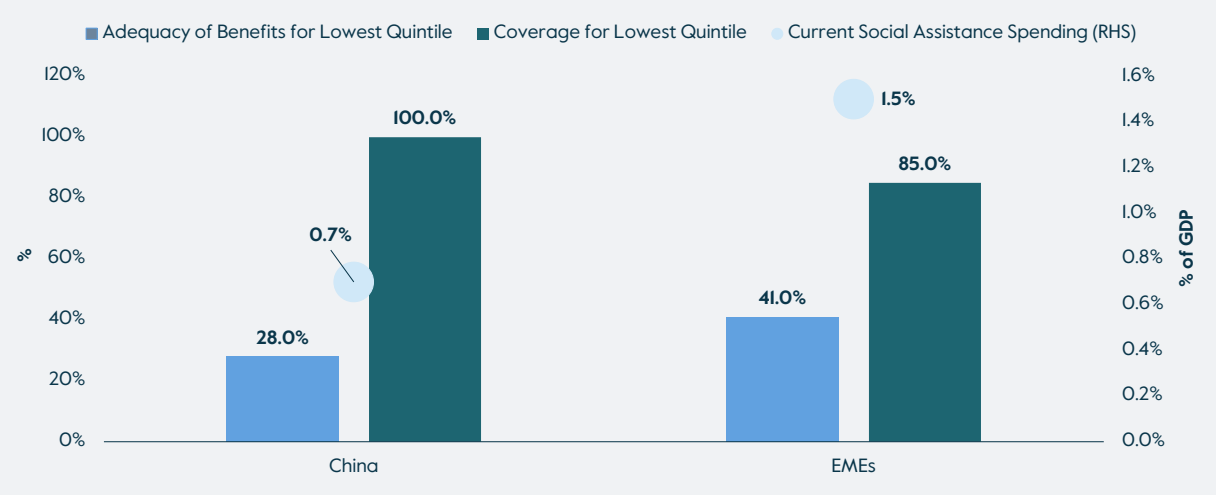


Figure II. Source: Carlyle Analysis of Portfolio Company Data, November 2021. There is no guarantee any trends will continue.
Figure I2. Source: IMF Article IV, January 2021. There is no guarantee any trends will continue.

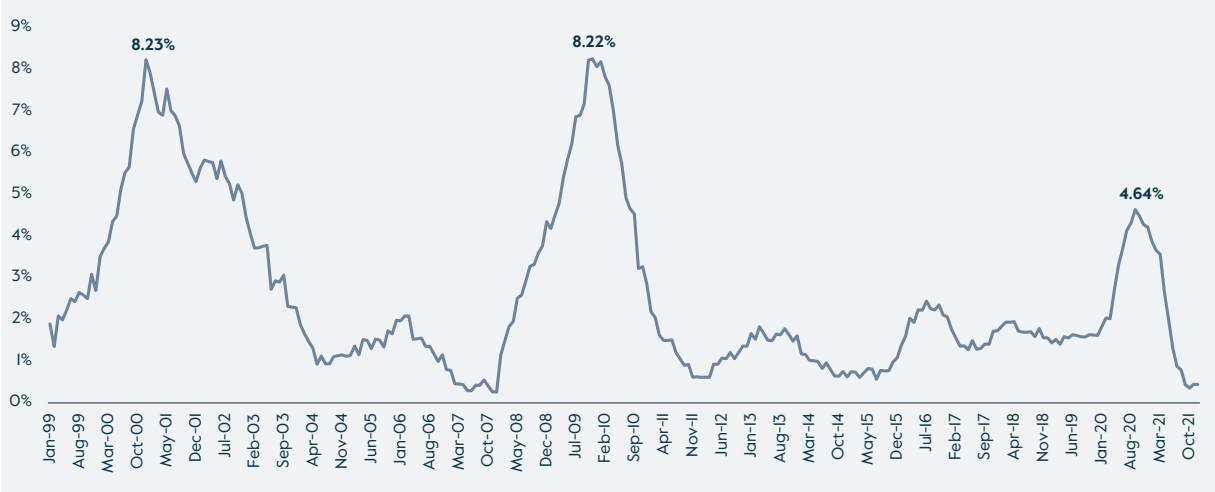
5

Could Credit Markets' Resilience Defy Skeptics?

Recessions typically result in a decline in corporate borrowing. The pandemic was the exception to the rule. Total indebtedness among U.S. nonfinancial corporate borrowers rose by over $1 trillion in just the first half of 2020, as businesses amassed liquidity buffers to ride out the disruption to operations. This succeeded in suppressing default rates, which peaked at about half the levels observed in prior recessions (Figure 13) and were concentrated mostly in industries like energy and retail already facing structural headwinds. But it also came at the cost of a much larger stock of debt entering the recovery. When accounting for incremental borrowing last year, the U.S. corporate debt load now stands at 82% of GDP, roughly 10 percentage points higher than its 2008 peak.[18]

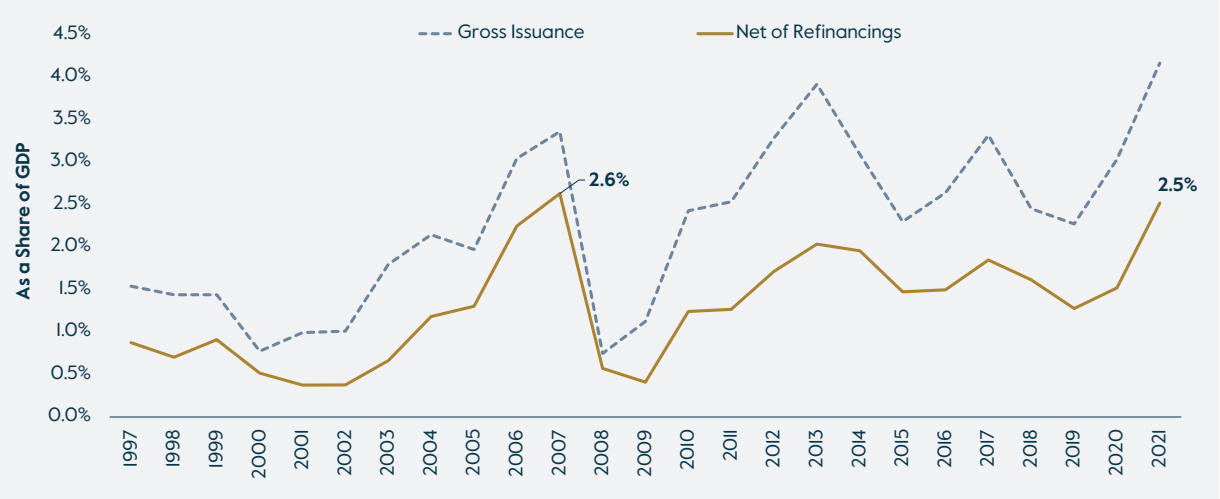
Low default rates tend to sharpen creditors' risk appetite. Leveraged finance markets have been wide open. Total speculative grade debt issuance reached a record in 2021, both in nominal terms and when measured as a share of GDP. When netting out the 40% of loans and bonds used to refinance existing obligations, total issuance was still higher in 2021 than in any year since 2007 (Figure 14). Rising issuance came in the context of higher leverage, with average debt-to-EBITDA ratios at origination also increasing to levels only exceeded by those observed in 2007.[19]

Figure 13.
Leveraged Loan TTM Default Rate



18 BIS, Credit Stats, December 6, 2021. Estimates for Q4 based on Federal Reserve data.
19 S&P LCD Database, December 2021.
Figure 13. Source: S&P LSTA Leveraged Loan Index, January 2022.

Figure 14.
Speculative Grade Debt Issuance to GDP



Debt-to-income, whether national (GDP) or corporate (average EBITDA), is but one way to measure debt sustainability. The other two – debt service costs and underlying asset values – paint a much more favorable picture (Figure 15). Thanks to low interest rates, debt service consumes less business cash flow than ever before. And with fixed rate bonds accounting for 53% of the speculative grade borrowing and many loans including LIBOR floors, interest coverage would remain above historic norms even with ten rate hikes over the next two years.

As equity contributions have risen more than proportionally with the increase in asset values, loan-to-value (LTV) ratios have declined to all-time lows. The lower the LTV, the greater the deterioration in economic fundamentals (EBITDA) or capital markets conditions (the multiple assigned to EBITDA) required to trigger a default event.

High LTVs are not just riskier in their own right, but also tend to be associated with cycles of excessive lending that inflate underlying asset prices.[20] Average LTVs has declined steadily since 2013 - from 63% to just 50% - suggesting that credit liquidity has played little role in the run-up in valuation ratios over this period.

At times, credit markets can engender hyperbolic commentary that's often more exciting than the markets themselves. Talk of "bubbles" or imminent crashes add some seasoning to the otherwise monotonous soup of getting paid back what you expect at the time you expect it. But boring is typically good; credit market problems tend to be preceded by innovations in institutions, products, or enhancement strategies that hide risk or obscure who's bearing it. Lenders that seek adequate compensation for risks they consciously assume tend to be the solution rather than the problem.

20 For classic treatments of this phenomenon, see: Kiyotaki, N. and J. Moore. (1997), "Credit Cycles," *Journal of Political Economy;* and Holmstrom, B. and J. Tirole. (1997), "Financial Intermediation, Loanable Funds, and the Real Sector," *The Quarterly Journal of Economics.*
Figure 14. Source: Carlyle Analysis; Bureau of Economic Analysis; Bank of America Merrill Lynch, January 2022.

Figure 15.
Divergence in Credit Metrics

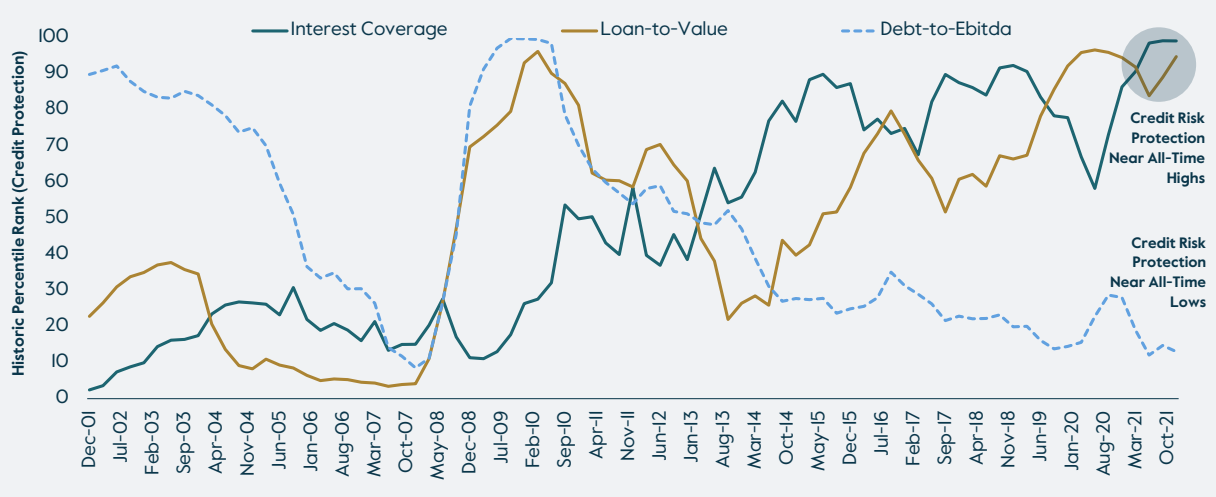


Figure 15. Source: Carlyle Analysis of S&P LCD Database. January 2022. There is no guarantee these trends will continue.

Jason Thomas

HEAD OF GLOBAL RESEARCH
jason.thomas@carlyle.com / (202) 729-5420

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.

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

Prior to joining Carlyle, Mr. Thomas was Vice President, Research at the Private Equity Council. Prior to that, he served on the White House staff as Special Assistant to the President and Director for Policy Development at the National Economic Council. In this capacity, Mr. Thomas served as primary adviser to the President for public finance.

Mr. Thomas received a BA from Claremont McKenna College and an MS and PhD in finance from George Washington University, where he studied as a Bank of America Foundation, Leo and Lillian Goodwin Foundation, and School of Business Fellow. Mr. Thomas has earned the chartered financial analyst designation and is a Financial Risk Manager certified by the Global Association of Risk Professionals.