Sector Business Cycle Analysis

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There are different investment approaches to identify sector winners and losers, such as price momentum strategies, top-down approaches based on specific macroeconomic indicators and bottom-up approaches to identify sectors with improving fundamentals. One widely used approach is business cycle analysis. Since economic cycles usually exhibit characteristics that impact sectors or industries differently, investors may identify sectors that are favored by the current economic phase.

A standalone business cycle-based sector rotation is difficult to implement, as differences exist in economic conditions of each cycle over time and transformative technology continues to alter business model and economic impact. However, understanding cycle dependency on sectors is important to sector portfolio construction, particularly for a top-down approach.

To make a quantitative and systematic assessment of how different sectors performed through various business cycles, we used the Conference Board Leading Economic Indicator Index (LEI) to segregate business cycles and evaluated sector performance over multiple business cycles between 1960 and 2018. This provided a good sample size to evaluate sector performance consistency for different cycles.

Understanding and Defining Business Cycles

The concept of a business cycle was first introduced by Wesley C. Mitchell and Arthur F. Burns. They took the indicator approach that uses cyclical economic indicators to explore patterns of economic fluctuations.

> “Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals which merge into the expansion phase of the next cycle.”
>
> —Wesley C. Mitchell and Arthur F. Burns[1]

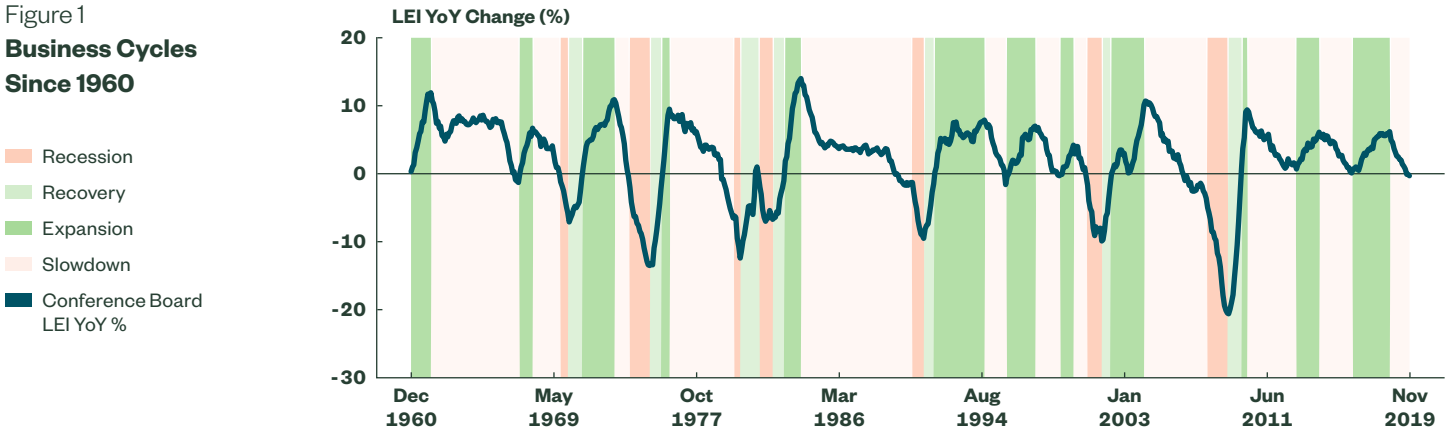
First published by the US Department of Commerce as part of the Business Cycle Indicators program in the late 1960s, the Conference Board's LEI Index follows this approach by aggregating 10 economic indicators (see Appendix II) — ranging from employment, business orders and financial conditions to consumer expectations — to summarize common turning-point patterns in economic data. The indicators included in the composite index have survived a wide variety of statistical and economic tests, such as consistency, economic significance, statistical adequacy, smoothness and promptness.

Most of the research on business cycles defines only recession and expansion through identifying peak and trough. However, we believe there are nuances in different stages between a peak and trough. Therefore, we divided the business cycle based on the direction and magnitude of changes of the Conference Board LEI Index.

- **Recession** The LEI Index declines to a trough at an accelerating pace[2]
- **Recovery** The LEI Index rebounds from a trough but below long-term trends
- **Expansion** The LEI Index YoY changes are positive and above long-term trends
- **Slowdown** The LEI Index YoY changes pass the peak and begin moderating

The chart below shows the delineation between these parts of the cycle:

Figure 1
Business Cycles Since 1960



Source: Bloomberg Finance L.P., SPDR Americas Research, as of November 30, 2019.

Evaluating Sector Performance Over Multiple Business Cycles

Although Global Industry Classification Standard (GICS) sector classification has become widely recognized and tracked by market participants, its performance history is limited, going back to only 1989 and covering only three recessions. To get a comprehensive account of sector performance over multiple business cycles, we leverage the performance data of Kenneth French 48 SIC-based (Standard Industrial Classification) industry portfolios based on the latest GICS sector definitions. We then equally weight industry performance to create a longer sector performance history that covers seven recession and recovery periods, 12 expansions and 11 slowdowns. Appendix I lists the GICS sectors assigned for the 48 SIC-based industry portfolios.

In order to fully evaluate sector performance over business cycles, we assess how well the sector performed and how consistent the performance is in each type of cycle by using the following six metrics:

1. Average monthly sector return
2. Average monthly sector excess return over the broad market[3]
3. Average return of the sector over each business cycle[4]
4. Average excess return of the sector over each business cycle
5. Percentage of months when the sector outperformed the broader market
6. Percentage of cycles when the sector outperformed the broader market

We then calculate the sector z-scores based on these metrics to standardize results across all sectors and allow for easy comparison. Next, we calculate a composite score by equally weighting each metric to identify top and bottom three sectors for each business cycle.

Four Stages of the Business Cycle

Recession During a recession, economic activities fall significantly across the board, with declining economic outputs and aggregate demand from both consumers and businesses. It features increasing unemployment, low consumer confidence and contractionary domestic production. Monetary policy attempts to increase aggregate demand by lowering interest rates and increasing the money supply.

Recovery During a recovery, the economy rebounds sharply from the bottom, but below trend. GDP growth and aggregate demand accelerate. Consumers become more positive about economic growth, start taking advantage of the low interest rates and increase their discretionary spending, while businesses stop cutting back on commercial activities.

Expansion Economic growth reaches the cycle peak. Amid rosy economic prospects and increasing corporate profits, companies begin to allocate capital to expand business and improve productivity to meet increasing demand. Interest rates start rising from their relatively low levels.

Slowdown Capacity utilization usually reaches cycle peaks and economic output gaps turn positive, meaning the economy is running beyond full capacity. Limited capacity constrains economic growth from accelerating further, leading to positive but decelerating growth. Monetary policy becomes more restrictive to steer the economy away from overheating.

Our findings on sector performance during different phases follow:

Figure 2
Recession

	Cons. Disc.	Cons. Staples	Energy	Financials	Health Care	Industrials	Materials	Real Estate	Technology	Utilities
Average Monthly Return (%)	-1.5	-0.1	-0.2	-1.8	-0.5	-1.7	-1.4	-3.1	-2.5	-0.3
Average Monthly Excess Return (%)	0.1	1.5	1.4	-0.2	1.1	-0.1	0.2	-1.5	-0.9	1.3
Average Period Return (%)	-12.0	1.0	-3.5	-13.3	-2.9	-14.8	-11.5	-21.6	-20.3	-1.6
Average Period Excess Return (%)	1.0	14.0	9.0	0.0	10.0	-2.0	1.0	-9.0	-7.0	11.0
Hit Rate (% of Months Outperforming the Market)	49.3	70.4	53.5	53.5	59.2	46.5	47.9	43.7	39.4	60.6
Hit Rate (% of Periods Outperforming the Market)	29.0	86.0	71.0	43.0	86.0	29.0	43.0	14.0	14.0	100.0
Aggregated Z-Score	-2.0	8.3	4.6	-2.0	5.2	-3.4	-1.3	-8.6	-7.7	6.6

Source: Kenneth French Data Library, SPDR Americas Research, as of November 30, 2019. The top three sectors are shaded in green. The bottom three are shaded in orange.

During a recession, as shown in the table above, noncyclical sectors, like **Consumer Staples, Utilities** and **Health Care**, performed well, as their business ties to nondiscretionary spending are less sensitive to economic fluctuations. They outperformed the broader market by an average of more than 10% during six of seven recession periods. **Real Estate** and **Technology** are among the worst-performing sectors across all the metrics. As their business ties to highly discretionary spending from both consumers and businesses, these sectors tend to be the first to experience spending cuts during periods of diminishing income and business activities.

Figure 3
Recovery

	Cons. Disc.	Cons. Staples	Energy	Financials	Health Care	Industrials	Materials	Real Estate	Technology	Utilities
Average Monthly Return (%)	3.4	1.9	2.8	2.4	2.3	2.9	3.0	3.6	3.0	1.6
Average Monthly Excess Return (%)	1.1	-0.3	0.6	0.1	0.0	0.6	0.7	1.3	0.7	-0.6
Average Period Return (%)	33.1	18.0	27.1	23.1	21.4	27.4	29.3	39.2	28.4	14.7
Average Period Excess Return (%)	12.0	-3.0	6.0	2.0	0.0	6.0	8.0	18.0	7.0	-7.0
Hit Rate (% of Months Outperforming the Market)	64.5	43.5	53.2	54.8	46.8	56.5	61.3	58.1	53.2	45.2
Hit Rate (% of Periods Outperforming the Market)	86.0	29.0	57.0	57.0	43.0	71.0	71.0	57.0	71.0	29.0
Aggregated Z-Score	7.3	-7.5	0.8	-1.5	-4.1	2.2	3.8	7.2	2.3	-9.1

Source: Kenneth French Data Library, SPDR Americas Research, as of November 30, 2019. The top three sectors are shaded in green. The bottom three are shaded in orange.

In a recovery phase, improvement in the labor market and consumer confidence leads to increases in discretionary spending on restaurants, travel and durable goods,[5] benefiting **Consumer Discretionary** sectors. While recessions tend to hit the real estate market hard, the low interest rates and easing monetary policy following the recession make it cheaper and easier to purchase real estate. The recovery in commercial activities also lifts the value of commercial real estate, contributing to the **Real Estate** sector's outperformance. The outperformance of Consumer Discretionary is more consistent than that of Real Estate, given its higher hit rate on both a monthly and periodic basis. On the other hand, sectors that are favored during the recession — **Consumer Staples, Utilities** and **Health Care** — lose their attraction as the market rebounds and investors embrace more cyclical sectors to capture upturns in the market.

Figure 4
Expansion

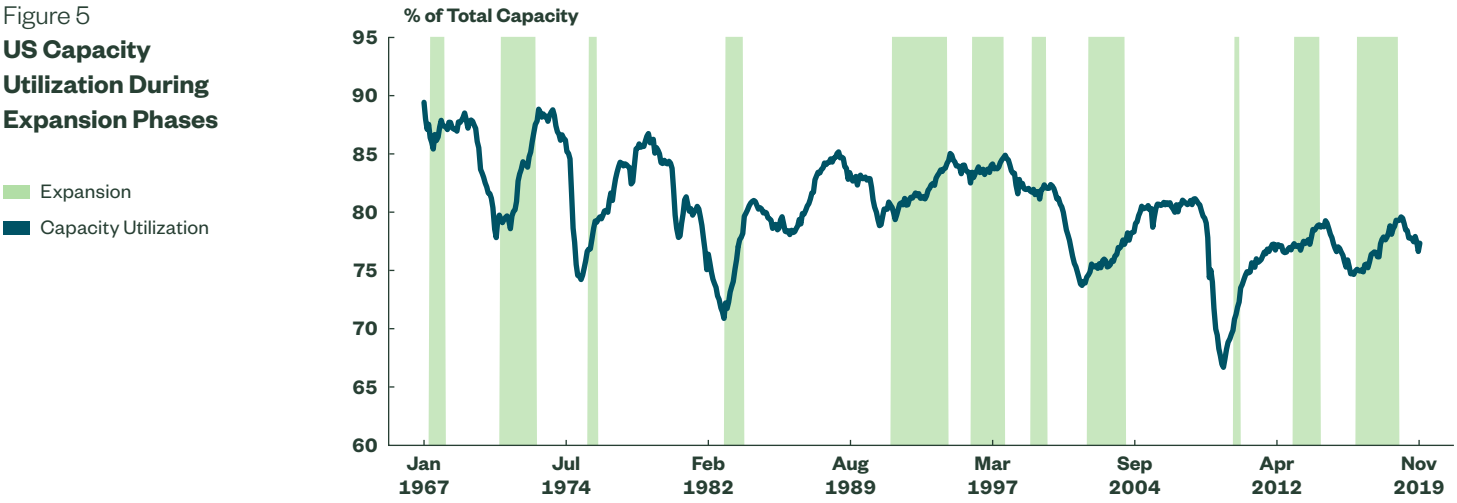
	Cons. Disc.	Cons. Staples	Energy	Financials	Health Care	Industrials	Materials	Real Estate	Technology	Utilities
Average Monthly Return (%)	1.4	0.9	1.2	1.7	1.0	1.4	1.2	1.5	1.8	0.7
Average Monthly Excess Return (%)	0.1	-0.4	-0.2	0.4	-0.3	0.1	-0.2	0.1	0.5	-0.6
Average Period Return (%)	16.6	10.6	15.5	18.7	10.8	16.2	13.1	17.8	21.0	7.6
Average Period Excess Return (%)	1.0	-5.0	0.0	3.0	-4.0	1.0	-2.0	3.0	6.0	-8.0
Hit Rate (% of Months Outperforming the Market)	50.7	47.3	47.8	58.0	47.3	51.7	46.8	51.7	51.7	41.5
Hit Rate (% of Periods Outperforming the Market)	73.0	45.0	45.0	91.0	27.0	55.0	55.0	55.0	82.0	9.0
Aggregated Z-Score	2.8	-4.7	-0.9	8.0	-5.0	2.1	-1.9	3.3	7.6	-10.3

Source: Kenneth French Data Library, SPDR Americas Research, as of November 30, 2019. The top three sectors are shaded in green. The bottom three are shaded in orange.

The expansion phase features narrow sector dispersion, as economic growth accelerates to its peak and more sectors benefit from the economic boom. Market returns are at their second best during this phase, following behind the recovery phase, but the duration of this phase tends to be longer. During this phase, capacity utilization tends to increase significantly, to its peak, as shown in Figure 5.

Businesses feel more confident about their growth prospects and start expanding, allocating more capital to improve productivity, such as investing in **Technology**. Interest rates also start moving up from very low levels. Increasing loan volume and higher interest rates tend to benefit **Financials**. Technology's and Financials' outperformance is quite consistent, as they beat the market in 10 out of 12 expansion phases. Noncyclical sectors continue to be out of favor during the economic expansion phase.

Figure 5
US Capacity Utilization During Expansion Phases



Source: Bloomberg Finance L.P., SPDR Americas Research, as of November 30, 2019.

Figure 6
Slowdown

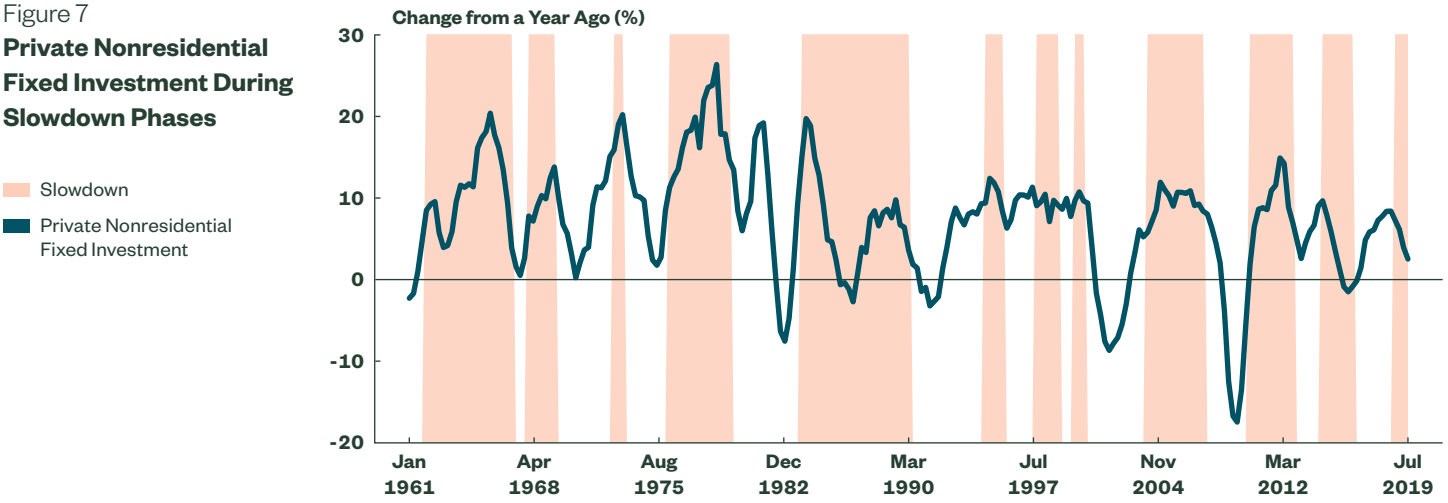
	Cons. Disc.	Cons. Staples	Energy	Financials	Health Care	Industrials	Materials	Real Estate	Technology	Utilities
Average Monthly Return (%)	0.8	1.3	1.0	1.0	1.3	1.1	0.9	0.5	1.0	1.0
Average Monthly Excess Return (%)	-0.1	0.3	0.0	0.0	0.3	0.1	-0.1	-0.4	0.0	0.1
Average Period Return (%)	5.5	14.6	8.5	13.7	15.0	11.9	6.5	2.4	10.1	11.8
Average Period Excess Return (%)	-5.0	4.0	-2.0	4.0	5.0	2.0	-4.0	-8.0	0.0	2.0
Hit Rate (% of Months Outperforming the Market)	46.9	57.9	51.4	48.0	54.2	53.1	48.3	44.7	48.9	50.3
Hit Rate (% of Periods Outperforming the Market)	36.0	73.0	55.0	36.0	73.0	73.0	36.0	27	45.0	55.0
Aggregated Z-Score	-5.4	8.1	-0.3	0.5	7.3	3.8	-3.8	-10.8	-0.9	1.4

Source: Kenneth French Data Library, SPDR Americas Research, as of November 30, 2019. The top three sectors are shaded in green. The bottom three are shaded in orange.

As economic growth decelerates and input costs increase, corporate profitability growth comes under pressure, remaining positive but slowing down. Given capacity and efficiency constraints, companies spend more on capital expenditures to meet demand, but there is usually a lag between the deployment of capex and rising productivity. The overall market return is at its second worst during this phase. Investors start positioning more defensively and reducing their allocation to economically sensitive sectors in anticipation of the next economic downturn. This leads to the outperformance of **Health Care** and **Consumer Staples** and the underperformance of **Consumer Discretionary** and **Real Estate**. **Industrials** is the third-best-performing sector, as it benefits from increasing investment in capital products. However, increases in capex did not occur or were not significant every time economic growth slowed. As shown in Figure 7, during the 1984–1989, 2014–2016 and 2019 slowdowns, private nonresidential fixed investment declined significantly, leading to **Industrials'** underperformance in all three periods.

Figure 7

Private Nonresidential Fixed Investment During Slowdown Phases



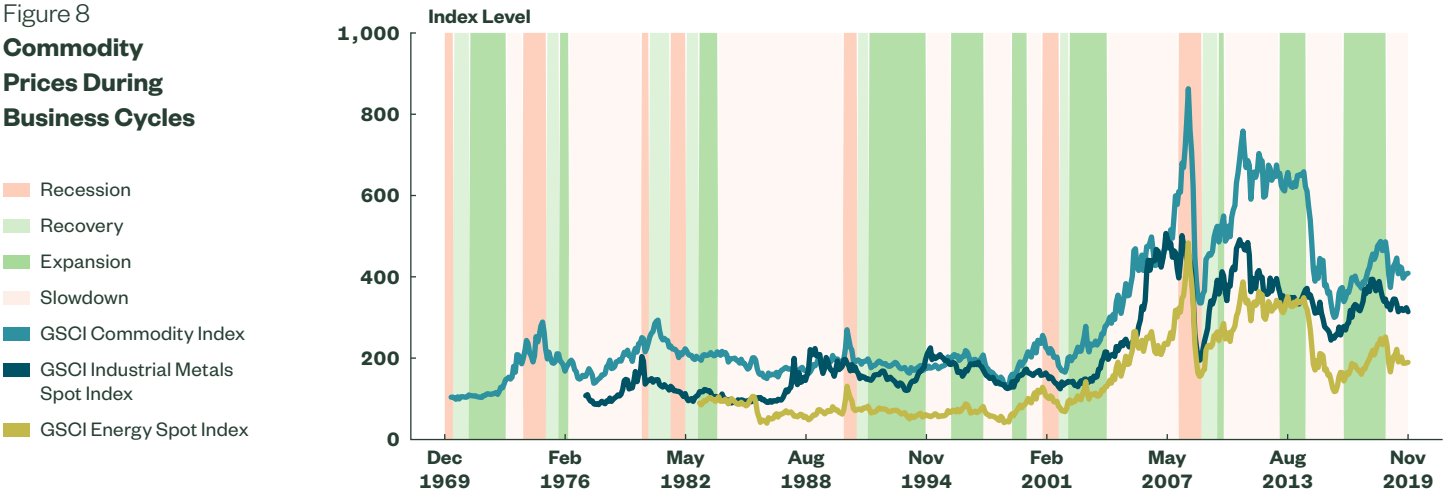
Source: Bloomberg Finance L.P., SPDR Americas Research, as of September 30, 2019.

Outliers

Materials and **Energy** are commonly expected to perform well during a slowdown, as the positive output gap during this phase tends to lead prices of oil and basic materials higher and contribute to profitability. However, as these markets have become more integrated with the global market, the boom of commodity prices during US economic slowdowns has occurred less frequently since the 1980s.

Figure 8

Commodity Prices During Business Cycles

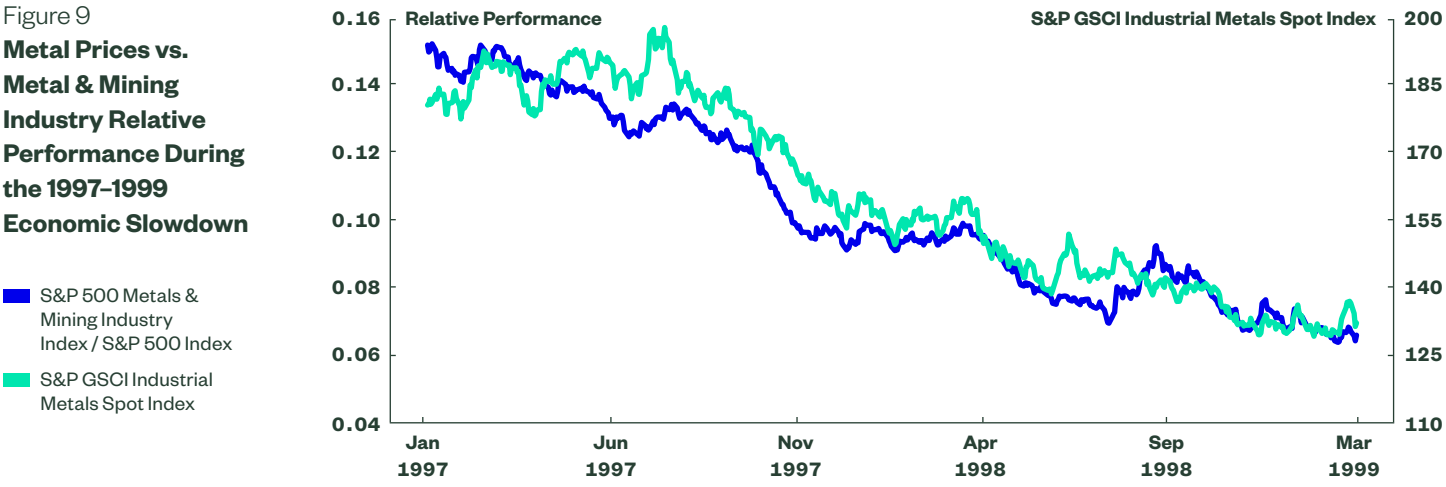


Source: Bloomberg Finance L.P., SPDR Americas Research, as of December 31, 2019.

Energy did not make the top/bottom three sectors during any business cycle, indicating it may not be as sensitive to US economic cycles as most people think it is. Energy company profitability is directly tied to oil prices. Given the fungibility of the industry outputs and highly connected global commodity market, energy firms' profits are more driven by the oil supply and demand worldwide. Since OPEC member countries produce approximately 40% of the world's crude oil and oil exports represent 60% of the total petroleum traded internationally, OPEC's actions have significant influence on global oil prices,[6] impacting US energy firms' profits. Furthermore, geopolitical tensions can play a big role in OPEC's actions, introducing more idiosyncratic risks to the sector. For example, the oil embargo imposed by Arab producers against the western world in 1973, the Gulf War in the 1990s and, more recently, Venezuela's oil crisis all impacted the market. Also, the supply glut in 2015 caused by the adoption of fracking technology shocked the energy market, weighing down energy stocks while the broad economy was slowing down.

Materials Firstly, negative idiosyncratic industry events coincided with certain slowdown periods. In the 1990s, the emergence of state-controlled chemicals and mining companies in developing countries undercut US producers and miners' market shares and pricing power. In 1997–1998, the Asia/EM financial crisis reduced global demand for metals and mining products. Traditional metals and minerals exporters, such as Russia and Brazil, turned to the US — where the economy was more insulated from the crisis — to dump their extra capacity. Even though US demand of basic materials was strong in the late stage of expansion, metal prices dropped by 25% because of the flood of foreign supply, sending metal & mining stocks down by 21%, compared with a positive return of 43% for the S&P 500 Index, as shown in Figure 9.

Figure 9
Metal Prices vs. Metal & Mining Industry Relative Performance During the 1997–1999 Economic Slowdown



Source: Bloomberg Finance L.P., SPDR Americas Research, for the period from November 1, 1997 to March 31, 1999.

Secondly, given that only 15% of the US GDP is contributed to by goods-producing industries, compared with 80% by service-producing industries, the US economy has become more service-based and less reliant on resource-intensive production. The shift of the global manufacturing center to Asia drove flows of natural resources to that region. Therefore, **Materials** may have become less sensitive to the overall US economic cycles but more impacted by global economic conditions.

Establishing a Sector Roadmap for Business Cycles

Below are the 11 GICS sectors' aggregated z-scores based on the six metrics. Given that the new Communication Services consists of former Technology, Consumer Discretionary, and Telecommunication stocks, we calculated its z-score as the weighted average of the three sectors' z-scores.

Figure 10
Sector Z-Scores for Business Cycles

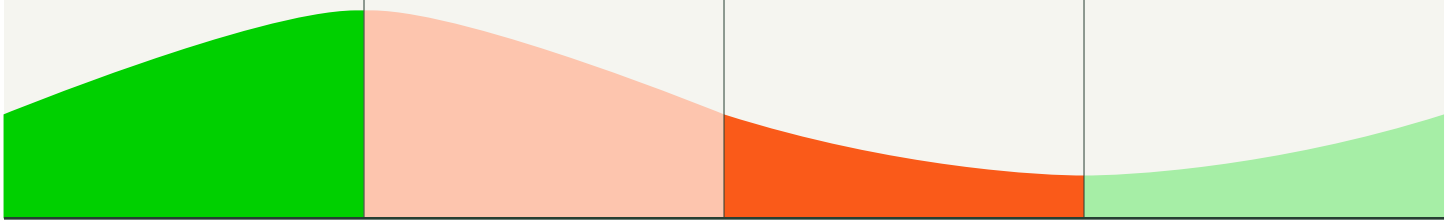
	Cons. Disc.	Cons. Staples	Energy	Financials	Health Care	Industrials	Materials	Real Estate	Technology	Utilities	Comm. Services
Recession	-2.0	8.3	4.6	-2.0	5.2	-3.4	-1.3	-8.6	-7.7	6.6	-4.3
Recovery	7.3	-7.5	0.8	-1.5	-4.1	2.2	3.8	7.2	2.3	-9.1	1.1
Expansion	2.8	-4.7	-0.9	8.0	-5.0	2.1	-1.9	3.3	7.6	-10.3	3.9
Slowdown	-5.4	8.1	-0.3	0.5	7.3	3.8	-3.8	-10.8	-0.9	1.4	-1.9

Source: SPDR Americas Research, as of November 30, 2019. The top three sectors are shaded in green. The bottom three are shaded in orange.

Based on the z-scores above, we created the sector road map below to show sector positioning in different part of the business cycle.

Figure 11
A Sector Roadmap for Business Cycles

Expansion	Slowdown	Recession	Recovery
• Growth reaches its peak • Increasing capex to improve productivity and meet increasing demand • Interest rates start rising from their relatively low levels	• Capacity utilization peaks • Positive output gaps • Positive but decelerating growth • More restrictive monetary policy	• Declining economic outputs • Falling demand from both consumers and businesses • Increasing unemployment • Low consumer confidence • Easing monetary policy	• Economy rebounds but below trends • Consumer expectations improve • Discretionary spending increases • Businesses stop cutting back on commercial activities • Monetary policy remains accommodative
++ Financials Technology + Communication Services – Consumer Staples –– Health Care Utilities	++ Consumer Staples Health Care + Industrials – Materials –– Consumer Discretionary Real Estate	++ Consumer Staples Utilities + Health Care – Communication Services –– Real Estate Technology	++ Consumer Discretionary Real Estate + Materials – Health Care –– Consumer Staples Utilities



Source: SPDR Americas Research, as of December 31, 2019. ++/-- indicates the two best/worst-performing sectors. +/- indicates the third-best/worst-performing sectors.
For illustrative purposes only.

The above sector business cycle analysis provides a general view on how sectors perform during different parts of the economic cycle. Unique characteristics and the idiosyncratic nature of each cycle warrants individual analysis on a case-by-case basis. Furthermore, secular industry trends and/or technological shifts that are less impacted by cyclical economic development may exist throughout multiple cycles and provide long-term growth opportunities. For example, booming biotechnological innovations, emerging robotics and automation backed by Artificial Intelligence (AI) all increase the demand for cybersecurity defense.

Appendix 1

SIC Sector and GICS Sector Mapping

SIC Sector	GICS Sector	SIC Sector	GICS Sector
Agriculture	Cons. Staples	Precious Metals	Materials
Food Products	Cons. Staples	Non-Metallic and Industrial Metal Mining	Materials
Candy & Soda	Cons. Staples	Coal	Energy
Beer & Liquor	Cons. Staples	Petroleum and Natural Gas	Energy
Tobacco Products	Cons. Staples	Utilities	Utilities
Recreation	Cons. Disc.	Communication	Communication
Entertainment	Cons. Disc.	Personal Services	Cons. Disc.
Printing and Publishing	Communication	Business Services	Industrials
Consumer Goods	Cons. Disc.	Computers	Technology
Apparel	Cons. Disc.	Computer Software	Technology
Healthcare	Health Care	Electronic Equipment	Technology
Medical Equipment	Health Care	Measuring and Control Equipment	Industrials
Pharmaceutical Products	Health Care	Business Supplies	Industrials
Chemicals	Materials	Shipping Containers	Materials
Rubber and Plastic Products	Materials	Transportation	Industrials
Textiles	Cons. Disc.	Wholesale	—
Construction Materials	Materials	Retail	Cons. Disc.
Construction	Industrials	Restaurants, Hotels, Motels	Cons. Disc.
Electrical Equipment	Tech	Banking	Financials
Automobiles and Trucks	Cons. Disc.	Insurance	Financials
Aircraft	Industrials	Real Estate	Real Estate
Shipbuilding, Railroad Equipment	Industrials	Trading	Financials
Defense	Industrials	Steel Works	Materials

Source: SPDR Americas Research, Kenneth French Data Library, as of December 31, 2019.

Appendix 2

Ten Economic Indicators Consisting of the LEI Index

1. Average weekly hours, manufacturing
2. Average weekly initial claims for unemployment insurance
3. Manufacturers' new orders, consumer goods and materials
4. ISM Index of new orders
5. Manufacturers' new orders, nondefense capital goods, excluding aircraft orders
6. Building permits, new private housing units
7. Stock prices, 500 common stocks
8. Leading Credit Index™
9. Interest rate spread, 10-year Treasury bonds less federal funds
10. Average consumer expectations for business conditions

Source: The Conference Board, as of December 31, 2018.

Endnotes

1 Burns and Mitchell, *Measuring Business Cycles*, 1946, p. 21.

2 When identifying recessionary periods, we made small adjustments to the beginning month to match with the economic peak identified by the National Bureau of Economic Research. The adjustments make the beginning month of recessions more aligned with the market downturn.

3 The broad market performance is represented by the value-weight return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX or NASDAQ.

4 Annualized return for the periods > 1 year, cumulative return for periods < 1 year.

5 How does consumer spending change during boom, recession, and recovery? Beyond the Numbers, June 2014, Vol. 3/No. 15, US Bureau of Labor Statistics.

6 EIA, What drives crude oil prices: Supply OPEC.

ssga.com/etfs

Glossary

Conference Board Leading Economic Indicator Index (LEI) A composite of 10 economic components that are analyzed monthly to help foresee changes in the overall economy. The LEI components are: average weekly hours of manufacturing workers; average initial jobless claims; new manufacturer orders for goods and materials; speed of delivery of new goods to vendors; new orders of capital goods not related to defense; new residential building permits; changes to the S&P 500 Index; changes in inflation-adjusted money supply; the difference between long and short interest rates; and consumer sentiment. The data series is compiled by the Conference Board, a private, non-profit business research group.

Leading Credit Index™ An index which consists of six financial indicators: 2-years Swap Spread (real time), LIBOR < 3 month Treasury-Bill yield spread (real time), Debit balances at margin account at broker dealer (monthly), AAII Investors Sentiment Bullish (%) less Bearish (%) (weekly), Senior Loan Officers C&I loan survey – Bank tightening Credit to Large and Medium Firms (quarterly), and Security Repurchases (quarterly) from the Total Finance-Liabilities section of Federal Reserve's flow of fund report. Because of these financial indicators' forward looking content, LCI leads economic activities.

Global Industry Classification Standard (GICS) A financial-industry guide for classifying industries that is used by investors around the world. The GICS structure consists of 11 sectors, 24 industry groups, 68 industries and 157 sub-industries, and Standard & Poor's (S&P) has categorized all major public companies into the GICS framework.

S&P 500 Index The S&P 500, or the Standard & Poor's 500, is an index based on the market capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ. The S&P 500 index components and their weightings are determined by S&P Dow Jones Indices.

ISM Index is based on surveys of more than 300 manufacturing firms by the Institute for Supply Management (ISM). The ISM Manufacturing Index monitors employment, production, inventories, new orders and supplier deliveries.

S&P Goldman Sachs Commodity Index, or S&P GSCI (Underlies GSG) A production-weighted index launched in 1992 that tracks the performance of 24 commodity futures contracts. The index tilts to commodities that are more heavily produced globally, so its weights more heavily to crude oil than, say, to cocoa.

S&P GSCI Energy Spot Index A benchmark that seeks to track investment performance in the energy commodity market.

S&P GSCI Industrial Metals Spot Index A benchmark that seeks to track investment performance in the industrial metals market.

S&P Metals and Mining Select Industry Index The S&P Metals & Mining Select Industry™ Index is a modified equal-weighted index that represents the metals and mining sub-industry portion of the S&P Total Market Index.

Standard Industrial Classification (SIC) A system designed to categorize US companies by industry.

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Important Risk Information

Investing involves risk including the risk of loss of principal.

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