3Q20 Commentary

Contents

"In the real world, things generally fluctuate between 'pretty good' and 'not so hot.' But in the world of investing, perception often swings from 'flawless' to 'hopeless.'"

- Howard Marks, cochairman and cofounder of Oaktree Capital Management

"Successful investing is about managing risk, not avoiding it."

- Benjamin Graham, professor and father of value investing

Welcome

What a ride! And to think we're only half-way through 2020…

After a terrible start to the year, 2Q20 saw a strong recovery with the S&P 500 up almost 20%. These extreme swings are nauseating but we caution investors from taking drastic action during times like these. Real wealth compounds over years, not through day-trading or market-timing. Do not fall victim to these fits of exuberance and despair! Stay level-headed and focus on long-term allocations that will help you achieve your investment goals whether that be saving for college, retiring, or buying a second home.

These short-term movements in price are often not based on fundamentals. For example, Microsoft (MSFT) is one of the most valuable companies in the world because of its dominant position in software, the growth of cloud computing, and its fortress balance sheet. In just one month, MSFT lost almost 1/3 of its value or $400 billion. Did MSFT suddenly lose its position as market-leader? Did the growth of cloud computing suddenly slow? Of course not! In fact, cloud computing is a beneficiary of the current work-from-home environment. MSFT's price drop had nothing to do with fundamentals and everything to do with investor emotions. Those investors who did not fall victim to their emotions saw their investment recover strongly and MSFT shares are now up on the year.

Amid such volatility, we think it is important to stay focused on information that is knowable and meaningful. The talking heads of CNBC love to prognosticate about the latest data point. We do not know what will happen with the next number for housing permits, consumer confidence, or oil consumption. Even if we *could* accurately predict these data points, would it help us as investors?

If, in April 2019, we found out that in one year, unemployment would be 20%, oil demand would be down over 30%, and air travel would be down over 90%, would we have bought stocks? It's highly unlikely but I hope we would have… investors who bought the S&P 500 in April 2019 and held on earned a 7% return.

At Novem, we remain focused on the long-term. The time it takes our investments to compound and earn a return is measured in years. After building an appropriate allocation, the most difficult and important part of investing is maintaining that allocation through periods like 1Q20 and 2Q20. This is why it is so important to understand your risk tolerance and work with a trusted financial advisor! As we look forward to the second half of the year, our focus remains on holding good allocations and staying invested through the cycle.

-Thank you for your time,
The Novem Investment Team

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2Q20 Review: The Reopening

The COVID pandemic continues but the economic Reopening is here. Barring a sharp reacceleration of infections, the Reopening will continue, though it will not always be smooth. As we said last quarter, the greatest unknown is the duration of the virus-related shutdowns. Returning to "normal" might depend on a vaccine, but many virus-related shutdowns are ending sooner. The Reopening reduces uncertainty in the market which drives stock and bond prices higher.

The pace and strength of the economic recovery depends on the ability of good businesses to survive. To gauge the economic recovery, we monitor the financial health of businesses as they bear capacity constraints, social-distancing and hygiene concerns. To better frame our research and forecasts, we focus on three factors that are crucial to the survival and recovery of businesses: liquidity, consumer resilience, and government support.

Liquidity is the lifeblood of business. A business's liquidity is defined by the cash on the balance sheet as well as the ability to quickly raise additional cash via capital markets. Banks and investors will only provide liquidity to businesses that are likely to survive. In a bit of a catch-22, only businesses that can secure adequate liquidity will survive and only businesses that are likely to survive can raise capital! By reducing uncertainty, the Reopening improves the odds of survival for many businesses. With less uncertainty, businesses can improve liquidity. In other words, the projected liquidity for many businesses is better now than it was two months ago. It is impossible to quantify in aggregate, but we think that the Reopening drives a virtuous cycle of improving prospects for many businesses.

The second factor we monitor and analyze is consumer resilience. How fast will consumers return after the Reopening? To be sure, concerts, weddings, sporting events and other large-crowd experiences will take the longest to recover. Still, it seems like consumers are ready and willing to resume their previous habits. We are encouraged by anecdotal evidence such as the (socially distant) diners now sitting outside our favorite restaurants. Moreover, the resilience of consumers is a global phenomenon. The president of PVH Corp., parent of Calvin Klein & Tommy Hilfiger, recently commented on these early, yet positive signs.

> *"Currently, all our stores in China are open. Since China started to reopen, we have seen strong week-over-week improvements across the board. …*
>
> *"Europe followed closely after Asia, where we have also seen strong week-over-week improvements. Currently about 85% of our stores are opened and trends are very encouraging. We're planning on the UK market to reopen early next week.*
>
> *"Lastly, in North America, stores here were the latest to reopen, and we will be at 85%*

reopen by next week. We are pleased to see how the consumers are coming back." [1]

We remain optimistic that, when allowed, consumers will return to their spending habits and support the economy.

The third factor we are monitoring is stimulus and government support. The most obvious example of this was the Paycheck Protection Program, or PPP loans that were pushed out to support small businesses. Washington is now discussing additional stimulus, either as an extension of the prior stimulus or as a wider infrastructure bill. Details are undefined but combining the Reopening with additional fiscal support would further strengthen the economic recovery.

We believe a more important aspect of government support is regulatory clarity and liability protection. With this, the federal government can protect businesses from frivolous lawsuits brought upon by the current pandemic. Regardless of the outcome, lawsuits are usually a losing proposition for many businesses because of the costs. Fighting such lawsuits consumes management's time and a great deal of money- both of which are in short supply. What protective measures are reasonable for businesses to reopen? If a customer may have contracted COVID on premises, can that customer sue the business? By offering regulatory clarity and liability protection the federal government can support the Reopening by instilling confidence in business owners.

Until there is a fully developed and available vaccine, our hope is that good businesses stay afloat thanks to improving liquidity and consumer spending as well as effective government support. It will likely take years for the US economy to fully recover and regain its potential, but we believe that the economy will avoid any of the 'worst-case' scenarios that captured so many headlines. At times, our optimistic stance was a lonely one, but the swift recovery of the markets in 2Q added some credibility to our position.

Tension with China Continues to Build

The China headlines took a back seat to COVID and the Black Lives Matter movement, but the underlying US/China rivalry never went anywhere. COVID itself became another point of contention as the US questioned China's transparency and handling of the pandemic. This resulted in President Trump announcing that the US will withdraw from the World Health Organization (WHO). The rivalry between the US and China will continue to manifest itself in various ways.

Perhaps the most significant point of contention is the loss of Hong Kong's autonomy. Since 1997, when the British turned Hong Kong over to China, there was "one country, two systems" where Hong Kong maintained its autonomy as a thriving democracy within communist China. Now, China is removing this autonomy piecemeal, setting off protests and drawing condemnation from other nations.

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[1] 1Q20 PVH Earnings Call. Stefan Larsson, President. 12 June 2020.

For investors, Hong Kong serves as a prominent international financial hub and enjoys special treatment on trade. Under the idea of "one country, two systems" Hong Kong was never subject to the various tariffs and trade wars between the US and China. Now, Hong Kong's special trade status is being revoked by the US on the grounds that Hong Kong is no longer sufficiently autonomous from China.

For China, Hong Kong is an important gateway to international markets. Of the capital moving into and out of China, 60% passes through Hong Kong. Also, Chinese banks hold more than $1 trillion in assets in Hong Kong, far more than any other country.[2] Reducing capital's ability to flow through Hong Kong could cause financial stress, particularly for the Chinese economy.

The US was the only superpower after the Cold War, but China's rise challenges this status quo. This power struggle will continue for decades and have far reaching impacts for investors. At this point, there are more questions than answers as the US and China continue to go back and forth on a plethora of issues. We continue to closely monitor developments in this geopolitical theme.

Low Interest Rates and the Challenges of Finding Income

In the US, the Federal Reserve lowered interest rates to zero to help address the economic dislocation caused by the COVID-19 pandemic. Low rates support businesses by lowering the cost of debt. This also completely changes the fixed income market for investors.

There was a time when investors could earn reasonable return on a fixed income allocation. In 2006, a 10-year US treasury bond yielded 4.8%. In 2006, about $2 million in treasuries would generate an annual income of $100,000. Today, a diligent saver who buys a 10-year US treasury bond will earn less than 1% a year! A retired investor looking to generate $100,000 a year in income would need *$14,000,000* in US treasuries to earn enough interest. With rates this low, it is nearly impossible to earn a reasonable income with bonds alone.

Simply holding plain-vanilla bonds to generate income is no longer an attractive option for investors but we do not recommend selling all your bond positions. Bonds are still important for investment allocations because they are less volatile than equities and offer downside protection. We see opportunities in other corners of the market such as dividend paying stocks, preferred stock, high yield bonds, and real estate to prudently improve their portfolio's income.

Stocks that pay a strong dividend can provide a source of income and appreciate over time.

[2] https://www.reuters.com/article/us-hongkong-protests-finance-explainer/explainer-how-important-is-hong-kong-to-china-as-a-free-finance-hub-idUSKBN2350VO#:~:text=WHY%20DOES%20CHINA%20NEED%20HONG,for%20equity%20and%20debt%20financing.

The Novem Investment team works diligently with advisors to build income-generating allocations. If you are looking for income, please reach out to your advisor - we would love the opportunity to help you.

2020 Outlook: Where Do We Go from Here?

Conviction Level

Our conviction indicates how we think these asset classes will perform against the broad market.

	High Conviction	Moderate Conviction	Neutral	Low Conviction	Very Low Conviction
Large Cap Equities		◆			
Small Cap Equities		◆			
Short-Term Fixed Income			◆		
Long-Term Fixed Income					◆
High Yield			◆		
Municipals				◆	

Conviction levels are for illustrative purposes only and should not be relied upon as investment advice, research, or a recommendation by Novem regarding (i) the asset class, (ii) the use or suitability of the model portfolios or (iii) any investment in particular. Only an investor and their financial advisor know enough about their circumstances to make an investment decision.

Large Cap Equities

The volatile environment is expected to continue in the short-term, but we maintain a Moderate Conviction for Large Cap equities over a medium to long term time horizon. We are still in the early stages of recovery from the Covid-19 pandemic and face uncertainty in the future.
We continue to prefer companies with solid balance sheets, especially companies that have been able to navigate the pandemic without taking on additional debt. We also prefer companies that will be able to continue business regardless of the status of the ongoing pandemic. i.e. Comm. Services, Health Care, Information Technology.

Small Cap Equities

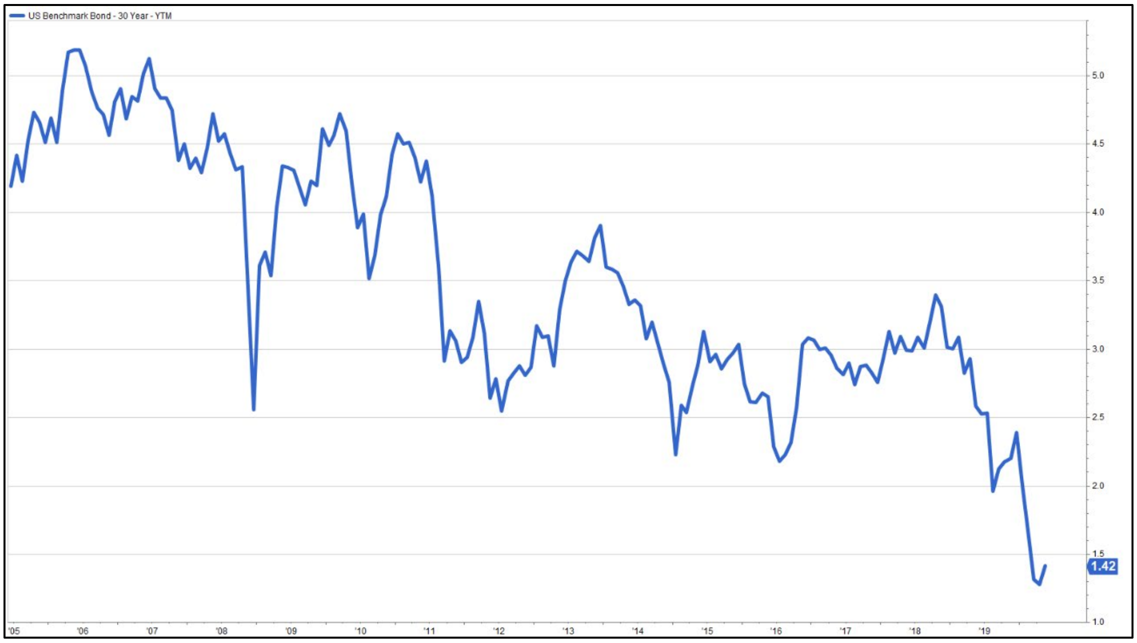
In Small Caps we also prefer companies that have strong balance sheets. The Russell 2000 YTD is down almost 20%, which confirms the top-heavy recovery we have seen so far in the markets. This points to a potential weakness in the overall markets that could lead to an additional correction before year end. We continue to expect volatility in the near term, but with a long-time horizon this could be an attractive entry-point. The chart below shows the year-to-date indexed performance of the S&P 500 (large companies) versus the Russell 2000 (smaller companies).

Short-Term Fixed Income

Short-term fixed Income provides a safe haven for investors who want to preserve liquidity during these uncertain times. There is not much compensation for being on the sidelines with the 2-year treasury at 0.19%. However, some investors may prefer to preserve a higher portion of liquidity during these uncertain and volatile times.

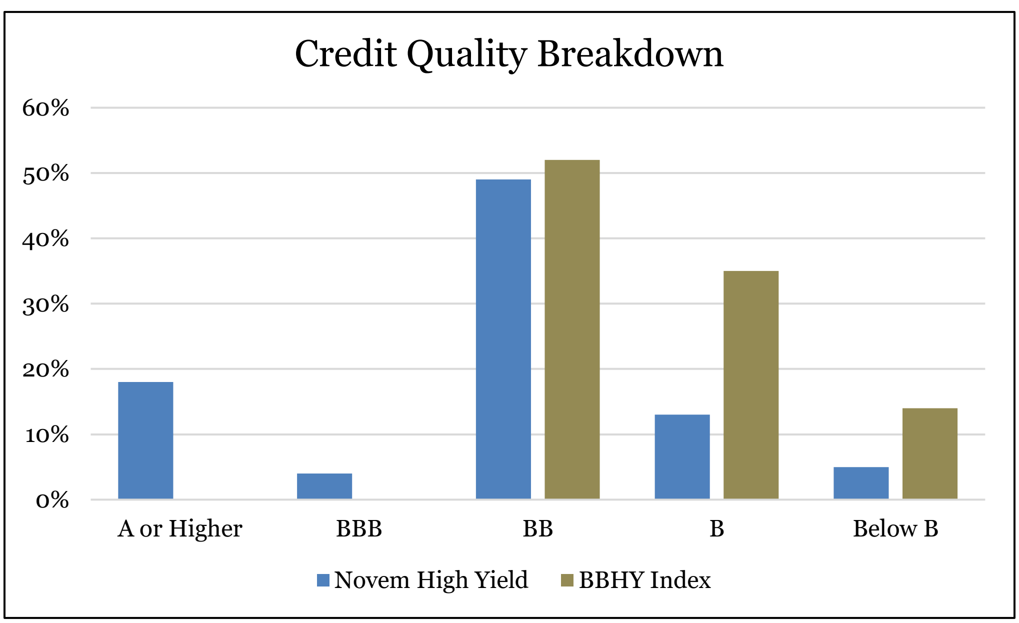
Long-Term Fixed Income

Per the chart below, 30-year treasuries yield a historically low 1.42%. The Federal Reserve has made it clear they will hold rates low in the short term to help the economy through the pandemic. This will continue to keep downward pressure on treasury yields. However, yields on long-term treasuries may see some improvement in the 2nd half of the year as longer-dated bonds are issued to help cope with the rising budget deficit but, yields will likely remain historically depressed.



High Yield

So far in 2020 five high yield corporate bond ETFs have gathered more than $1 billion of net inflows. This was partially aided by the Federal Reserve announcement to purchase High Yield ETFs, but their purchases total about $200 million, or 20% of this inflow. Most of the flows to high yield are either investors simply following the Fed or taking on more risk to earn a higher yield. High yield remains one of the few areas to generate income however this income comes with the increased risk that the companies could default on their bonds. Through the end of June, Novem High Yield strategy continues to have higher overall credit quality than the Bloomberg Barclays High Yield Index (BBHY) which may help mitigate some of the risk.



Municipals

We have low conviction towards Municipal Bonds. Municipalities continue to experience historic levels of liquidity stress. There may be individual opportunities that arise but, as an asset class, we do not think investors are adequately compensated for the risk municipals represent. The CARES act includes $454 billion to help backstop business and $150 billion in direct federal aid to states and municipalities. But this may not be enough. State and local governments will likely face extreme budgeting issues as the pandemic continues as expenses increase and tax revenues fall.

Deep Dive of the Quarter: Electric Vehicles and Battery Technology

Electric Vehicles versus the Internal Combustion Engine

Amidst a global push for sustainability and reduced CO2 emissions, electric vehicles (EVs) are growing in popularity. But EVs are not a new concept. At the turn of the 20th century, more American automobiles were powered by electricity than gasoline. In the early 1900s, Henry Ford and Thomas Edison worked together on developing the Ford Electric. At the time, Edison was unable to develop a cost-effective battery with enough storage to compete with the internal combustion engine (ICE). Today, the consensus investment opinion is that EVs will ultimately displace the ICE. But the basic issues faced by Ford and Edison remain prevalent today: EV batteries must hold a great amount of energy, recharge quickly, and maintain a useful life after numerous recharge cycles, all while remaining cost effective.

Battery Technology

A fully charged EV has nearly comparable range to an ICE with a full tank. The Tesla Model S advertises a range of 370 miles[3] which is comparable to a Toyota Camry at 410 miles.[4] This range makes EVs suitable for normal driving but represents a challenge for long-haul trucking where semi-trucks can travel 700 miles in a day. To increase battery range further, simply making the batteries bigger is one option, but this reduces performance and increases costs.

To improve efficiency, most battery innovations focus on optimizing the components of battery cell or making the entire battery lighter. There are three main components to a battery cell: the cathode, anode, and electrolytes. Most lithium-ion batteries use lithium nickel manganese cobalt oxide, or NMC, for the cathode. Artificial graphite serves as the anode and electrolyte additives help the battery avoid degradation over time. NMC/graphite chemistries are common among EV batteries because they are known to increase the energy density and lifespan of lithium. Ongoing innovations will continue to improve battery range, thereby improving EVs position versus ICEs.

Another concern for EVs is recharging. While there are gas stations everywhere, there is not a national infrastructure of charging stations. A quick search on Tesla's website shows only one publicly available supercharger in Rochester, NY. Infrastructure aside, recharging is also a time concern. At the most basic, slower charging level, it can take over 20 hours to fully charge a Tesla battery. Even at a supercharger station, a Tesla will take 30 minutes to charge to 80% and about 90 minutes to reach full capacity.[5] Still, this is much slower compared to quickly pulling

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[3] https://www.tesla.com/models/design#battery Long Range Plus lists 402mi range, Performance lists 348mi range. We used 370mi for our estimates.

[4] https://www.toyota.com/camry/features/capacities/2550/2549/2514. Assumes V6 engine. 15.8 gal. tank and combined fuel mileage of 26 mpg.

[5] https://www.tesla.com/supercharger

off the highway and pumping gas. To match the versatility of ICEs, EVs need to be able to handle longer trips, either through improved range or easier, faster recharging.
The question of battery life, or how many times a battery can recharge before deteriorating materially, is another important part of the EV equation. Building a battery with a long lifespan is incredibly important in improving the viability of EVs. Current lithium-ion batteries have a lifespan of 400-500 charges[6] before the capacity begins to degrade significantly in a non-linear fashion. Using Tesla's Model S range of 370 miles per charge,[7] this would suggest an effective battery life of about 165,000 miles. EV batteries are acceptable for normal driving conditions, the average passenger vehicle travels about 13,500/year,[8] but under more difficult conditions they come up short versus the ICE. For example, a long-haul semi-truck will routinely log over 100,000 miles in a year.[9] In order to surpass ICEs, batteries need better durability so they can handle more recharging cycles.

There is progress in extending the useful life of EV batteries. In April 2019, Elon Musk, Tesla's outspoken CEO, promised Tesla will soon have a battery that can last one million miles. Last September, battery researchers published a paper detailing a lithium-ion battery that "should be able to power an electric vehicle for over 1 million miles" while losing less than 10% of its energy capacity.[10] Tesla was awarded a patent on a battery almost identical to the one described just days after the paper's publication. It has not been confirmed whether this patented battery is the million-mile battery Musk promised, but results have shown it can be charged and depleted more than 4,000 times which implies a battery life in excess of 1 million miles. Such a breakthrough is monumental compared to current lithium-ion batteries' life of about 165,000 miles. Building a battery with such a long lifetime would significantly improve the prospects for EVs.

Finally, in order to displace ICEs, the batteries that power EVs must be affordable. The cost of EV batteries has already fallen dramatically – a kilowatt-hour, which cost about $1,100 in 2010, cost only $156 in 2019, on average.[11] With additional growth, economies of scale will further lower the cost curve. Eventually, recycling will play a huge role in making batteries affordable and environmentally friendly. The production of lithium-ion batteries is incredibly energy intensive, beginning with the extraction of raw materials and continuing through the manufacturing of the battery cell. Commodity analysts Leigh Goehring and Adam Rozencwajg have raised additional concerns with the standard NMC cathode, noting that "it will be difficult

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[6] Goehring & Rozencwajg, 'Déjà Vu: A History and Study of Electric Vehicles and the Oil Market Today', First Quarter 2018, http://info.gorozen.com/2018-1q-goehring-and-rozencwajg-commentary
[7] https://www.tesla.com/models/design#battery Long Range Plus lists 402mi range, Performance lists 348mi range. We used 370mi for our estimates.

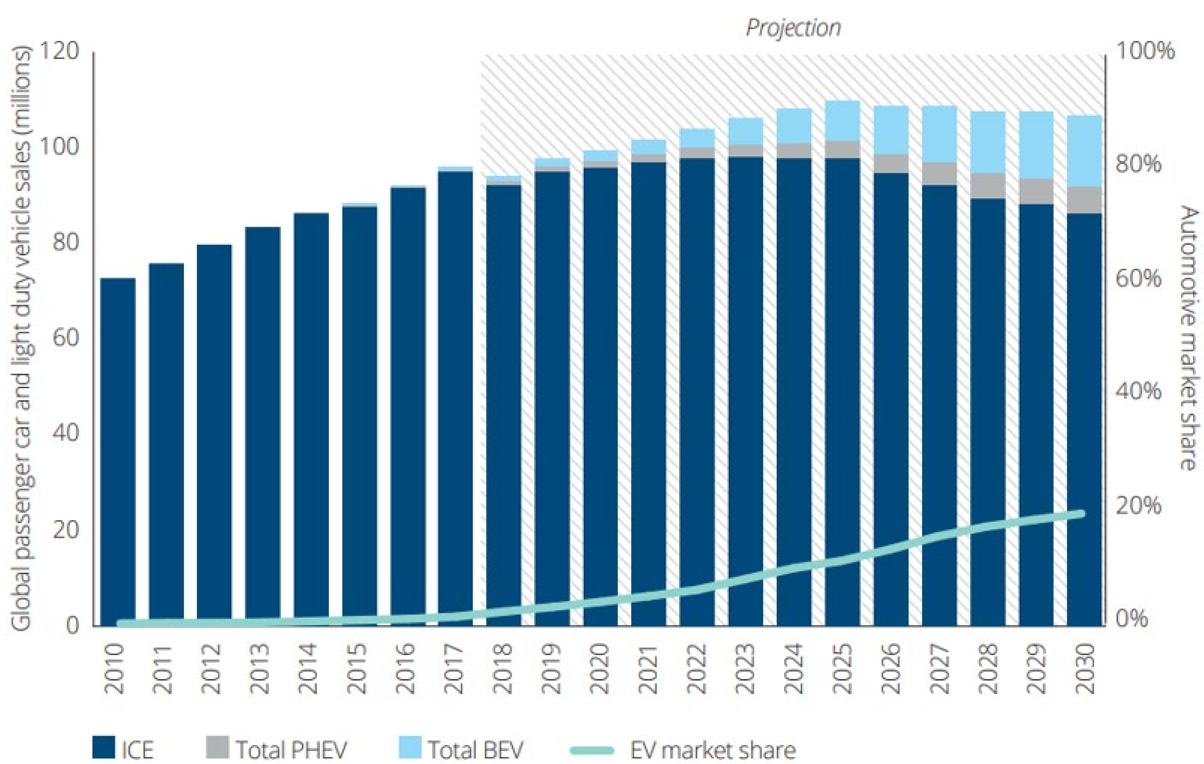
[8] https://www.fhwa.dot.gov/ohim/onh00/bar8.htm
[9] https://www.npc.org/reports/FTF-report-080112/Chapter_3-Heavy_Duty_Vehicles.pdf
[10] https://www.wired.com/story/tesla-may-soon-have-a-battery-that-can-last-a-million-miles/
[11] https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/

if not impossible to find high-grade cobalt and nickel deposits to meet future demand."[12] Innovation in battery recycling and construction must continue to drive the growth trends in EVs.

EV Growth

Global EV sales have increased from ~8,000 units in 2010 to 2.21 million units in 2019 according to data from the International Energy Agency,[13] a 75% CAGR! While this growth is impressive, EVs represent just 2.6% of global car sales. The most important factor influencing

Outlook for annual global passenger car and light duty vehicle sales



Source: IEA, IHS, Deloitte analysis Battery EV (BEV), Plug-in Hybrid EV (PHEV)

consumers decisions on EVs is the purchase price. Government incentive programs have supported EVs by lowering consumer costs. Norway is the most extreme example as the biggest adopter of EVs. Thanks to Norway's heavy taxes on ICEs, EVs account for almost 50% of new car sales.[14] On a global basis, current outlooks show a tipping point in 2024 when ICE sales will begin to contract. EVs are estimated to have ~10% of the market share in 2024 and

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[12] Goehring & Rozencwajg, 'Déjà Vu: A History and Study of Electric Vehicles and the Oil Market Today', First Quarter 2018, http://info.gorozen.com/2018-1q-goehring-and-rozencwajg-commentary

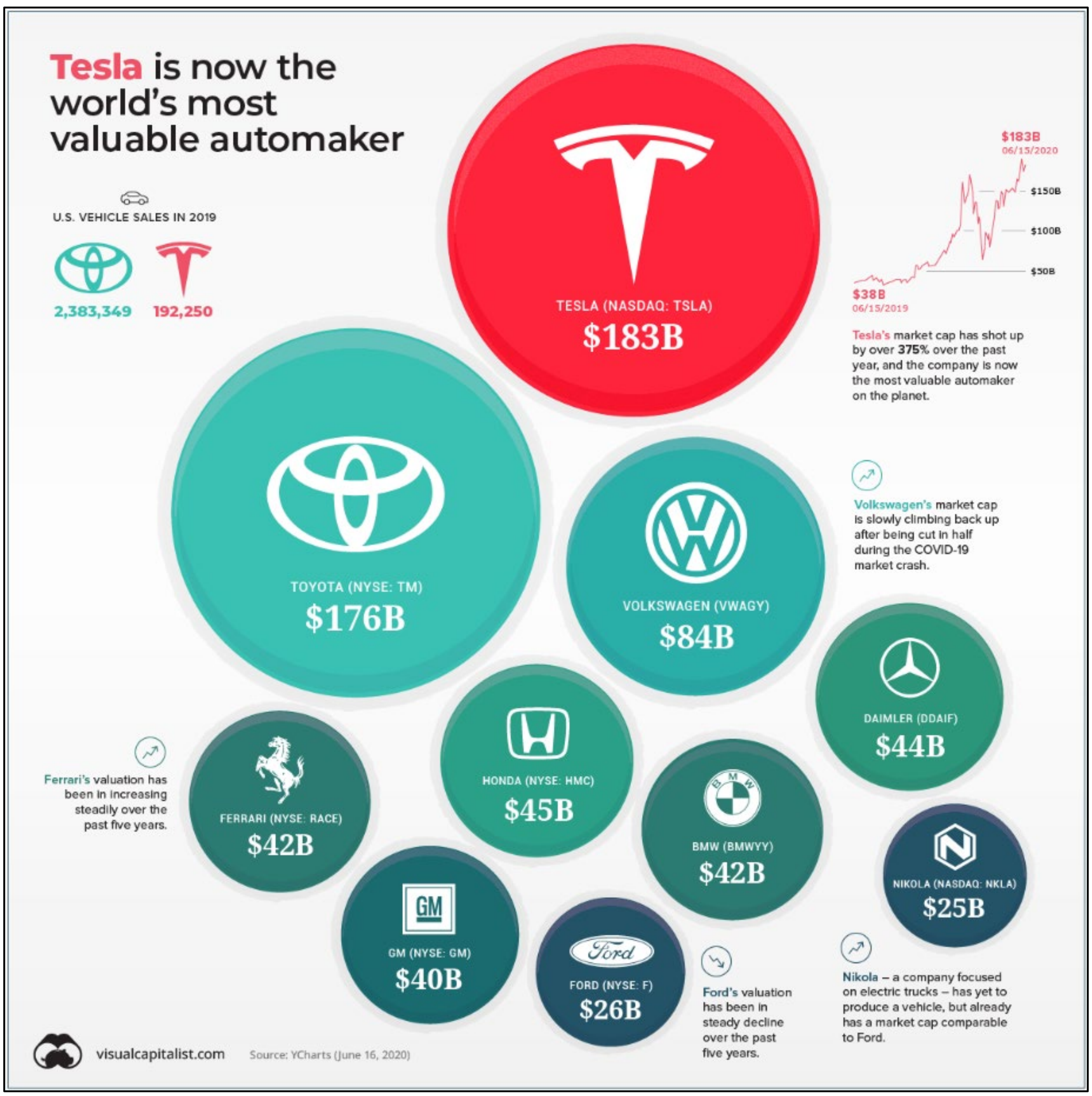
[13] https://www.iea.org/reports/global-ev-outlook-2020

[14] CFRA, 'Industry Surveys: Automobile Manufacturers', May 2020, www.cfraresearch.com

~20% of the market share by 2030 although additional government support could accelerate this could help expedite their adoption. It's also worth noting that this impressive growth of EVs has come during a period of low and falling gasoline prices. If gasoline prices begin to rise again like they did in the 2000s, it could be an additional tailwind for EVs.

Industry Competition

As battery technology improves, EVs will continue to take share from ICEs. But what companies will build these cars? The only pure EV company with an actual car or truck is Tesla (TSLA). Newer companies Nikola (NKLA) and Rivian (Private) have EV concepts but have not built a single car. As the below chart illustrates, this fact stopped these companies from getting sky-high valuations.



Automobile manufacturing is not a great business. Margins are low and competition is extremely high. It is also very expensive to reduce capacity which means many firms would rather compete without profits than close factories. As the industry transitions from ICE's to EVs, this competition is set to continue. In total, automakers announced plans for over 200 new EV models over the next 5 years alone – looking at the estimated 2030 EV sales numbers in the US, the list is littered with household names: Nissan, Honda, BMW, Mercedes Benz, Volkswagen, Tesla, Volvo, etc.[15]

We strongly believe that EVs will displace ICEs. Indeed, they already are. Government support is facilitating this transition now but advances in battery technology and affordability are at the heart of this trend. We also expect that the auto industry will remain highly competitive as it transitions to EVs. Over the next two decades this trend will continue and have profound impacts across our economy, infrastructure, and environment.

[15] CFRA, 'Industry Surveys: Automobile Manufacturers', May 2020, www.cfraresearch.com

What We're Reading

The investment team at Novem is constantly reading and drawing lessons from these books to help us analyze markets. This is one of our recent favorites. If you have any good recommendations, please send them our way!

Mastering the Market Cycle by Howard Marks

In this book, the cofounder of Oaktree Capital and one of the best investors in our generation discusses the struggles of investing and reacting to market cycles. Marks frequently publishes letters to his investors, and the book draws heavily on his prior communication and research. The goal of all this is very clear- investors should position capital to benefit from future moves in the market. What is so difficult is understanding the best way to accomplish this as an investor. Positioning portfolios for what lies ahead is an incredibly difficult, emotional, and psychological exercise.

Mastering the market cycle does not mean selling everything at the absolute peak and buying at the very bottom. Peaks and bottoms can only be identified after the fact, so it is impossible to tell if the market is at one of these points. Instead, Marks urges investors to understand the intrinsic value of their investments and maintain the "emotional fortitude to persevere" if the market prices move against them.[16]

As our opening quote says, "in the real world, things fluctuate between 'pretty good' and 'not so hot.' But in the world of investing, perception often swings from 'flawless' to 'hopeless.'"[17] What exacerbates these fluctuations is investor psychology. During good times, investors buy into dreamy stories of future profit potential. During bad times, investors are skeptical and scared of future losses.

Marks lays out the below stages of both bull and bear markets to illustrate how prevailing attitudes and psychology can build inertia and drive the market to extremes.

Stage	Bull Market	Bear Market
1	Only a few perceptive people believe things will get better.	A few thoughtful investors recognized that, despite prevailing bullishness, things won't always improve.
2	Most investors realize improvement is actually taking place.	Most investors realize things are deteriorating.
3	Everyone concludes that things will get better forever.	Everyone is convinced that things can only get worse.

[18]

[16] Marks. Pg 237.
[17] Ibid, 96.
[18] Ibid, 194.

Many investors follow performance and chase trends. What worked over the last month, year, or five years might not work going forward. It's important to focus on positioning your portfolio for the road ahead so you can achieve your investment goals. This is why it is so important to think independently and rationally about your investing goals.

What We're Drinking

On our list of favorite things, cold beer ranks as a close third behind undervalued stocks and a good book. As the COVID shutdowns devastate small businesses everywhere we thought it would be fun to highlight a local favorite.

Seven Story Brewing in Bushnell's Basin is what we're drinking this quarter. With ample outdoor seating right off the canal, Seven Story is the perfect place to grab an Adirondack chair, a cold beer, and enjoy the beautiful summer weather. Their rotating draft list has something for everyone – with everything from standard IPAs and Blonde Ales to dark beers. If you're feeling adventurous, take a shot at their cleverly named "Nobody Chaperones the Chaperone," a Vanilla Pastry Pale Ale. Regardless of what you drink, you're sure to enjoy the amazing atmosphere at Seven Story Brewing.

P.S. If you get hungry, the Pontillo's in Bushnell's Basin is fantastic!

Historical Perspective

As investors, we are constantly bombarded with data and news. It is very easy to become myopic and focus on non-material or short-term information. We have found that looking at long-term data and studying history provides good perspective and helps keep us focused on the right issues.

Too Much Information?

Colleges Fear Student Postings on Popular 'Facebook' Site Could Pose Security Risk, originally printed in the Wall Street Journal December 8, 2005

> *The hottest website on college campuses is Facebook, a group of free online communities where students can gossip about friends and interests, share photos, and flirt. It's a more in-depth online version of the paper "facebooks," filled with photos and brief biographies, which many colleges still hand out to incoming freshmen. It has become so ubiquitous that "facebooking" someone- as in checking out their photo and personal profile online- is standard campus lingo.*
>
> *But some students post much more detailed, personal information on Facebook, including cellphone numbers, physical addresses and even racy photos. That has led some universities to question whether it poses various privacy and security risks- including student harassment. Any backlash could give Facebook, Inc. a black eye just as it is ramping up its operations raising venture capital and hiring more staff.*
>
> *"I'm floored at some of the (information) students put up about themselves" on Facebook, says Lori Zientara Edgeworth, an administrator at the University of Toledo in Ohio. Ms. Edgeworth says she has seen photos posted of underage students drinking at parties. She's also handled disciplinary cases related to Facebook, most of them sparked by students who felt threatened about comments or photos posted about them or classmates online. Ms. Edgeworth is now considering some workshops on the dangers of putting too much personal information online.*
>
> *Other colleges are exploring ways to limit students' exposure to Facebook. Last summer, the University of New Mexico, citing possible security breaches of the school's own computer systems, banned students from accessing Facebook from university computers. In October, the University of Virginia sent an email warning students to "use caution" when cruising sites like Facebook.*

Sometimes it takes years or even decades for an issue to come to fruition. Maintaining and protecting privacy in an era of social networks and data analytics is such an issue. Privacy concerns are getting increasingly difficult for technology companies to navigate. Technology companies collect extensive amounts of data and the breadth of this collection is increasing. It is almost impossible to know exactly what personal data are collected and how these details are used. The boundaries of personal information are opaque and there is little discretion applied regarding the appropriate use of these data. With these circumstances, it is difficult to maintain the ideas of liberty and personal privacy. We expect to be writing more about this topic in the years to come.

Disclosures

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