

Rocaton

INSIGHTS

*Technological Change and its Impact
on Financial Markets*

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EXECUTIVE SUMMARY

- We believe technological change is one of the most impactful secular trends that will create new industries and eliminate others, impact productivity, and change our daily lives.
- Very rapid technological change has the potential to create extreme investment outcomes (both positive and negative) over medium and long time horizons across many different sectors and asset classes.
- Importantly, certain asset classes and sectors are more exposed to technological change than others. Within sectors and industries there will likely be winners and losers based on how management teams position themselves. As a result, there may be increased potential for active managers to deliver results which deviate from passive exposures (either positively or negatively).
- Investors should be cognizant of asset classes and sectors that are most exposed to obsolescence risk. In some cases, certain asset classes may be “long” innovation or insulated from technological change.
- In our view, the longer the timeframe to receive investment returns from a given investment, the greater the risk from innovation. As such, we believe the risks that technological advances pose are magnified for long corporate bondholders. As a result, long duration fixed income investors might want to consider diversifying their long corporate exposure.
- From our perspective, innovation is also partly responsible for keeping inflation low over the last few decades. Continued low inflation may impact inflation sensitive asset classes such as TIPS and commodities.

Introduction

In recent years, investors have placed a greater emphasis on understanding the various risks inherent in their portfolios. Often, investors cite economic growth, inflation and illiquidity as the primary drivers of risk. We believe another dimension that investors should consider is an asset's exposure to technological change. As one often cited example, consider that the iPhone, which accounts for approximately 70% of Apple's revenue, had just come into existence ten years ago. This example underscores just how quickly and thoroughly certain industries can undergo change. Certain asset classes in investment portfolios are “short” technological change which can lead to poor outcomes over the long-term while other asset classes are likely somewhat more insulated from rapid technological development. There are also market segments which are driven by technological innovation today, but are also besieged by competing technologies which have the potential to render them obsolete. The balance of this paper outlines the risk of technological change across a diverse group of asset classes and suggests ways for investors to potentially mitigate this risk. While technological change also undoubtedly has significant political and social impact, that discussion remains beyond the scope of this paper.

Technological Change and its Impact on Financial Markets

As we mentioned at the outset, technological change is expected to continue to be one of the most impactful secular trends that will influence future investment outcomes. Almost daily, investors are faced with headlines regarding autonomous vehicles, the rise in popularity of cryptocurrencies, and breakthroughs in artificial intelligence. While the timeline for these and other technological changes vary, there is no doubt that rapid advancements are taking place across a number of sectors and industries. Given the

pace of technological change it would not surprise us if we entered a period of increased volatility for leading companies across a number of industries. To be clear, we are not suggesting that markets will suddenly enter a period of heightened volatility, rather we are highlighting the increased pace at which change is likely to occur. Importantly, we would submit that the impact that this phenomenon will have on financial markets goes far beyond the public equity market and corporate entities. As we explain below, there are implications for governments and real assets, such as commodities and real estate. We explore the potential impact on various asset classes in greater detail below.

Public Equity

As the global economy evolves, the size and importance of certain sectors, as a percentage of the global economy, will grow while the size and importance of other sectors will shrink, as has been the case historically. What may be different from recent history is the heightened pace at which companies and certain industries are displaced due to technological changes. Importantly, there will be winners and losers within segments of the market. Perhaps the clearest example of this is a comparison of Amazon's market capitalization versus other retailers as shown in Figure 1.

Naturally, this example is at the forefront of many investors' minds. Yet there are a number of other situations where companies or industries have become obsolete in a short space of time. BlackBerry's were quickly replaced by iPhones, Netflix was partly responsible for the downfall of Blockbuster, and digital photos made Kodak's primary business virtually irrelevant. As we will highlight later, this type of rapid change might present opportunities for skilled active managers to add value by avoiding companies which will face pressures and investing in those companies which are poised to become industry leaders while other active managers might miss emerging trends and suffer performance shortfalls as a result. Additionally, investors pursuing passive strategies should not assume that they are immune to the impact of rapid technological advancement. Passive strategies tracking capitalization (or issuance) weighted indices are generally skewed toward past winners. Investors in such strategies should be cognizant of concentrations in companies or industries that are vulnerable to secular disruption.

Figure 1:

Market Capitalization for Retail Companies (\$ billions)

	November 30, 2017	December 31, 2007	December 31, 1997
Amazon.com, Inc. (AMZN)	\$567.2	\$38.5	\$1.4
Wal-Mart Stores, Inc. (WMT)	\$288.6	\$190.3	\$90.1
Best Buy Co., Inc. (BBY)	\$17.6	\$22.1	\$1.6
J.C. Penney Co., Inc. (JCP)	\$1.0	\$9.8	\$15.1
Sears Holding Corp. (SHLD)	\$0.4	\$14.1	N/A

Source: FactSet

Fixed Income

In many ways, the challenges we highlighted for public equities also apply to corporate bonds. While equity investors will likely experience losses/gains more quickly in the event of rapid change, bond holders are not immune to the risks we outlined. Insurance companies and pension funds appear to represent between 50% - 55% of the buyer base for investment grade corporate bonds¹. As such, they are often large buyers of long dated bonds of companies and therefore exposed to the ability of those borrowers to meet their debt obligations over a long time horizon. Further, the Bloomberg Barclays Long Corporate Index, which is representative of this opportunity set, is highly concentrated. The 20 largest issuers, some of whom are “short” technology or innovation risk represent over 30% of the benchmark. For example, AT&T, Verizon, and Microsoft represent the top three issuers in the long corporate bond index. While these companies are mainstays in their respective industries today, all three rely on continued innovation, to various degrees, to remain relevant. Depending on their success in adapting to change and participating in disruptive technologies, these companies could either strengthen their dominance, or become obsolete in a short period of time. In our view, the risk associated with lending to a corporation for a long period of time is perhaps heightened due to the pace of technological change. In the case of pension plans, corporate bond defaults or downgrades can be particularly problematic².

Importantly, the risks that technological change pose to investors is not limited to corporate credit. Sovereign bondholders are exposed as well. Russia and Saudi Arabia are instructive examples. If a significant portion of the world’s oil supply is destined to become a stranded asset due to technological advances in alternative energy, it’s highly likely, all else equal, that these countries’ fiscal positions will come under pressure and its credit quality will deteriorate. Emblematic of the potential challenges for Russia and Saudi Arabia is Venezuela’s recent default which can be partly attributed to low oil prices. A number of other countries may face similar challenges, particularly those with economies that are concentrated in one particular sector.

Importantly, while technological change certainly presents challenges to fixed income investors, it invariably will present opportunities as well, whether it is the potential emergence of solar securitization in the asset-backed security market or innovative infrastructure projects financed through the municipal market. Our comments on active managers apply here as well as investors may have the opportunity to add or detract value via credit selection. Further, it is unlikely that strategies which are managed relative to a benchmark will completely avoid certain industries/sectors. Rather, active strategies managed against a benchmark typically take modest under- and overweight positions.

Real Estate

The “Amazon effect” is far-reaching and goes beyond public equity investments. In fact, the real estate industry may have the strongest direct linkage to the disruption that Amazon and other firms are causing. Lenders and real estate owners are negatively exposed to this secular trend when there are store closings and/or tenant bankruptcies for traditional “brick and mortar” retailers. For real estate investors, retail is an important component of the commercial real estate market. As of September 30, 2017, retail represented approximately 24% of the NCREIF Property Index. For CMBS investors, retail

¹ Bloomberg Barclays, Federal Reserve, SNL Financial. ² Corporate bonds that default create a loss for an investor, but do not lower the liability value. Further, these bonds typically carry a higher yield than the broader index prior to a default (or downgrade). As a result, when these bonds are removed from the index or discount curve, the yield (or discount rate) often falls, potentially increasing the liability value.

typically represents 20-30% of a conduit CMBS collateral pool, on average³. Importantly, the battle between online and brick and mortar is more nuanced. Retailers that effectively integrate their online presence with physical stores will likely do well, while old, poorly located centers will likely continue to struggle. There are also implications for the industrial sector as Amazon (and other growing online retailers) continues to build out distribution facilities. These facilities are often built near major metro areas with access to airports, highways and shipping ports.

Of course, the impact that technology is having on the commercial real estate market is not limited to the retail and industrial sectors. Airbnb and HomeAway, among others, are illustrative of the dramatic impact that technology is having on the hotel sector. As another example, physical bank branches may become obsolete as consumers and businesses continue to make the shift towards online banking.

Other Considerations

There are other asset classes and pockets of the economy that are highly exposed to technological innovation. While we won't delve into the details, the examples below illustrate changes that are taking place and the potential challenges and opportunities facing investors.

- **Autonomous vehicles and ride sharing:** The impact of these technological developments will be directly felt by automakers (increased competition, potentially less demand) and transportation companies. However, there will likely be other industries that are affected:
 - * **Insurance:** Given the majority of accidents are caused by human error, we would expect autonomous vehicles to lead to fewer accidents and therefore significantly impact the insurance revenue model. Further, ride sharing's impact on car ownership may also have significant impacts on the auto insurance industry.
 - * **Airlines:** Short-haul flights may see a decline in demand as people opt to use their autonomous vehicle for shorter trips.
 - * **Hotels:** It is also possible that the need for lodging may drop as some people will choose to sleep in their cars during overnight road trips.
- **Asset Management/Financial Service:** Blockchain technology, artificial intelligence, and the rise of robo-advisors are some examples of the innovation that are likely to change the financial services industry. The precise impact that a certain technology, such as blockchain, will have on the asset management community is certainly debatable, but it has the potential to materially change the industry in a number of ways (e.g. trade processing, client onboarding, portfolio management, etc.).
- **Healthcare and longevity:** Innovation in healthcare could eradicate many diseases and dramatically extend life expectancy which would have significant implications for defined benefit, defined contribution and government programs. For example, defined benefit plans may be forced to pay benefits for a much longer period of time than is currently estimated. Likewise, it may become commonplace that defined contribution investors will need to save for 40 years of retirement rather than the current expectation of 20-25 years.

Importantly, there are likely segments of the economy that perhaps are somewhat more insulated from technological disruption. Companies that deliver certain healthcare services, or firms that provide highly specialized financial advice (e.g. corporate audits, M&A advisory, etc.) may be more protected.

Implications for Investor Portfolios

With the understanding that many asset classes are exposed to technological change, investors should look to position their portfolios in a way which can partially mitigate the downside of these changes. As we highlighted at the outset, investors should be aware of asset classes that are “long” innovation or more insulated from technological change. In addition, investors should also be cognizant of asset classes and sectors that are most exposed to obsolescence risk. Importantly, this comment does not take into account valuations or idiosyncratic risks that should, of course, be inputs into any investment decision. For example, equity market valuations today in the technology sector and the market broadly are elevated, potentially resulting in disappointing results over the short- and medium-term. Additional considerations for investors include:

- There are likely to be winners and losers within sectors based on how management teams position themselves. In theory, skilled active managers should be able to add value by avoiding companies which are most at risk and investing in businesses and management teams which can adapt more quickly to change. We have also pointed out that rapid technological change can present challenges for active managers who might miss emerging trends and suffer performance shortfalls. Finally, as we and others have studied at length, identifying skilled active managers is a difficult endeavor.
- No sector is immune from technological change; however, certain sectors may be more exposed than others. Retail and parts of the communications sector appear to be have relatively high exposure to technological change risk.
- Technological change appears to be reshaping the commodities industry as well. Consider the downturn in the coal industry which was largely a result of cheap natural gas prices. New drilling techniques, such as hydraulic fracking, have increased U.S. energy production, resulting in low crude oil prices in recent years. There may be parts of the energy industry which stand to benefit from technological change. For example, midstream energy companies (such as Master Limited Partnerships) appear to be the primary beneficiary of increased U.S. energy supply. We would note, however, that alternative forms of energy, such as solar and wind power, may cause a major shift away from hydrocarbons and, therefore, may disrupt the energy sector entirely.
- Beyond energy, other parts of the commodities sector may be disrupted. Residential and commercial pipes made of plastic are becoming more and more popular and are increasingly replacing aluminum, concrete, cast iron, copper or steel pipes.
- Venture capital appears to be positively exposed to technological change given its ability to invest in new and unproven technologies that may disrupt existing businesses. However, it is important to note that there is often high dispersion across venture capital strategies and there appears to be a limited number of consistently successful firms. Further, venture capital investing typically results in

a high number of failed investments and a limited number of massively successful investments.

- Fixed income investors, particularly long corporate bond investors, are significantly exposed to technological change as lending to companies for 30-years (or more) can be problematic if borrowers are slow to adapt. While high quality corporate and government bonds should be the cornerstone of a liability hedging portfolio, investors may want to consider exploring additional long duration investments. “Long duration alternatives” are asset classes which we believe have a reasonable correlation to the liability, provide a higher or comparable return to long corporate bonds, and offer diversification benefits to corporate credit risk. We provide a more detailed exploration of this topic in our white paper on this subject ([link](#)).

Conclusion

While the pace of technological change has been and will continue to be extremely disruptive, it also presents opportunities for investors as new industries will inevitably emerge and flourish. Most asset classes will be impacted, in some way, by the pace of technological change. Investors should think about which parts of their portfolio are most exposed to this risk. While we would certainly not advocate for a full overhaul of investor portfolios based on our views, changes on the margin can be beneficial. The most obvious example from our perspective is to diversify long corporate bond holdings with some of the alternatives that exist, such as long duration CMOs, private placements or commercial mortgage loans. Further, skilled active managers should have the opportunity to add value in certain asset classes by avoiding or underweighting companies which are most at risk from technological change. This statement, however, does not suggest that investors should move to active management in all parts of their portfolio as dispersion among securities will also result in underperformance for certain active managers and selecting skilled active managers is challenging. Lastly, we continue to emphasize the importance of diversification as it will be difficult to know with certainty which asset classes or sectors will be most impacted by technological change.

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