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January 2022

Let's Talk Inflation

By Rohan Kasoju and Kritnoor Singh Market Research Analysts

Overview

This article is a deep dive into rising inflation globally in recent times and its implications. We will explore how traditional drivers of this factor are diverging from the norms of the past several decades and what this means for the future of the world economy.

Inflation 101

Inflation is the measure of how aggressively the costs of goods and services are increasing in an economy. We can also think of it as a reduction in consumers' purchasing power in the market, since any increase in costs means consumers get less for their money. From consumer staples to healthcare and utilities, inflation leaves no industry untouched.

Inflation represents the unstable nature of world economies. There are so many unpredictable variables that drive inflation: costs of goods and services, costs of materials used in their production, labour wages, varying rates of economic growth across the world (and consequent exchange rate variations), taxes, government policies, trade conflicts, and most recently, unpredictable world pandemics [1].

However, there are 3 main mechanisms which explain why and how this occurs:

1. **Cost-Push Inflation**: When the costs of running a business (e.g. production/material costs, operational expenses, capital expenditures) rise, said businesses increase the prices of their goods and services, allowing them to offset their new expenses by passing it on to consumers.

2. **Demand-Pull Inflation**: When goods and services experience an increase in demand from consumers, especially in the absence of sufficient supply or production capacity, they become more valuable in the market, giving businesses the opportunity to charge more for them.

Reduced taxes (or loan/mortgage interest rates, as we will discuss later) also feed into this mechanism of driving inflation. Tax breaks allow consumers to have more disposable income on hand, and thereby more money to spend, creating more demand for products and services. This allows businesses to capitalize on the demand by increasing prices, creating what is called 'inflationary pressure' [2].

3. Printing Money: This is an intentional effort taken by governments to stimulate the economy and create more jobs, which essentially boils down to increasing the money supply in circulation by printing more and injecting it into the financial system. This means there is money to go around, chasing the same goods and services consumers have always wanted. Over time, this changes the status quo, as it spurs an increase in goods and service prices (via demand-pull inflation) [1].

Since in any case it takes time for the value of money to fall, there is an initial window of opportunity where the increased money in circulation DOES get you more goods. When capitalized on, people can increase consumption and corporations can produce more products (via increased production capacity and more workers). During these transition periods between the value of money, inflation can grow the economy, so we see that inflation is not always bad.

Low, controllable inflation could have economic benefits in the form of a more stimulated economy. Conversely, we can have periods of rapid, excessive inflation, referred to as hyperinflation [3]. When inflation lasts short-term (e.g. several months), it is considered transitory, whereas when sustained over long periods of time (e.g. several years), it is considered non-transitory [1].

Since prices and wages almost never grow at consistent, proportional, predictable rates, inflation effectively reduces consumers' purchasing power. One of the reasons we often hear that you should invest your money instead of saving it, is because over time, the inevitable inflation actually works against you. So the potential monetary growth you see through investing could secure you from the wrath of inflation.

Inflation In Our World Today - The Good, The Bad, and The Ugly

Negatively-Affected Industries

Inflation impacts all industries in a country. With the growing rates of inflation over the last couple years, consumer discretionary, industrials, materials and financials are some of the sectors that have suffered the most [4]. The rising cost of raw materials and the decreasing spending capacity of the market are potential causes.

Figure 1

The chart above tracks the price of the Vanguard Consumer Discretionary ETF from July 2021 to February 2022. In the aftermath of the second COVID-19 wave, which ended around July 2021, global cases reached and remained at a steady low (sub-600K new cases/day), until late-2021 when cases dramatically skyrocketed to all time highs unlike anything seen before (~4M new cases/day) [5].

By analyzing this ETF's price over the 7-month period, we can see that its pattern closely mimics that of the highly-volatile, global COVID-19 situation, which we previously established as a major driver of inflation as of late. In an almost inversely proportional fashion, the price remains consistent when new cases do, but experiences severe drops as cases spike.

Silver Lining - Prospering Industries

However, not all industries were adversely affected by inflation. In fact, industries such as energy, healthcare, real estate, utilities and consumer staples have outperformed their peers during this time [6], since these industries provide services that are necessities. Despite soaring prices, people still need these goods for survival and hence inflation is in fact profitable for these industries. Their minimal reliance on market conditions provides companies within these industries a sense of stability, making them "safer" alternatives to consumer discretionary sectors. Pfizer, Exxon, and Netflix are just a few examples of companies which are relatively secured from inflation's more adverse effects.

Figure 2

The chart above tracks the price of the Vanguard Real Estate ETF from March 2017 to January 2022. Over this almost 5-year period, the ETF has held up with steady growth; despite a drastic drop in early-2020 as an immediate effect of the unprecedented number of COVID-19 cases, it quickly recovered and went on to see sustained growth in a pre-pandemic fashion.

Regulating Inflation

A common practice taken by central banks globally (in Canada, this is done by the Bank of Canada) to regulate inflation is to manipulate short-term interest rates. Lowering interest rates on loans encourages consumers to borrow more money and promotes consumer spending, causing an increase in economic activity.

Conversely, raising interest rates on loans discourages people and corporations from borrowing money, resulting in more saving, less consumer spending, and ultimately economic downturn (slowed down economic activity and reduced economic growth).

Unprecedented Times

As expected, we have observed that in recent times, inflation has seen a steady increase globally. According to the Wall Street Journal, so far 2022 is "the biggest year for inflation over the last four decades" [3]. While interest rates have consistently remained stable, rate hikes are expected globally this year.

Inflation could be driven by a lot of reasons: rising production costs, more demand for a product or service than the supply, etc. Recently, the inflation rate increased due to supply chain issues caused by the COVID-19 pandemic [8]. China is a manufacturing behemoth, so when the pandemic worsened in the country, it inevitably affected the supply of numerous items. Some of the ports in China had to be shut due to COVID-19 concerns. Hence, with supply failing to meet market demand, prices saw dramatic rises across the board [8].

Recent Developments in Canada

The central bank usually has a cap on inflation and has measures ready to tackle it once it gets near the cap. The Bank of Canada has a 5-year plan for inflation and aims to keep it at roughly 2% [9]. The recent approach taken by the BoC is an interesting one. In the new budget, it continues the ongoing spending and expansion but hasn't taken any firm steps to decrease inflation. Moreover, in the spring budget there was a reported deficit of $154.7 billion dollars and further debt until 2026 [9]. Which means that on top of the expenses, the government of Canada is liable to pay that off as well. It has gotten to a point where the BoC's intervention is absolutely necessary to reduce inflation.

Interest

On January 26, 2022, the US Federal Reserve announced that there are plans to raise interest rates in the near future, as early as March 2022, in an effort to combat inflationary risks to the economy [11].

In March 2020, as the US entered lockdown due to the COVID-19 pandemic, the country experienced the start of a recession. In just the first few months of the pandemic, an unprecedented 40M+ workers filed for unemployment [10]. The Federal Reserve quickly reacted and lowered short-term interest rates to 0% so as to help minimize the recession's sudden impact [12].

Even after the economy started picking up and the country was well on its way to making it out of the recession just two months into its start, the rates remained very low to help people still struggling amidst the pandemic. As of January 2022, the Federal Funds Effective Rate (benchmark for all economic interest rates) is at 0.08%, not far off from the consistently sub-0.1 % rate over the past 2 years [13].

What This Means for Investors

Inflation is usually tough for investors since low spending capacity in the market means the investors might not be able to invest in the investments they really want to because of financial restraints. Moreover, inflation is fatal for some companies as we discussed above. So companies that investors have gone long on might not yield the best results. This could be the other way around as well since inflation is profitable for some companies as well.

Usually, there is a change in interest rates to deal with inflation which leads to arbitrage opportunities. Arbitrage exists when there is a non-zero chance of making a profit without taking on any risk. Arbitrage can occur in a lot of ways: manipulation of fixed income financial instruments like bonds, dealing with stock options in foreign currency, going long and having a put option as a safety net, etc. Rising inflation is an interesting time in the market for a lot of reasons and could impact investors in a lot different ways.

Assets like real estate property and commodities are historical defences against inflation, seeing how their prices are usually some of the quickest to respond in the wake of economic shocks [13].They offer an interesting value proposition for anyone looking to secure themselves from any adverse effects from downturn economies.

Future Outlook

The future of this wave of inflation is uncertain. The government measures as discussed above are not strong enough to tackle the persistent inflation. If the steps required are taken, inflation could be handled soon but if not we might be facing inflation for a long time.

Having said that, the economy has a way of balancing itself out. Disinflation is a process where inflation corrects itself in an economy [14]. It is different from deflation, which is a decrease in the price level of items available in the market. Disinflation deals with the rate of inflation gradually going down. But if this is the case, then the government would have little control over the inflation rate and it might not meet their cap or their 5-year plan.

Conclusion

All in all, the volatile state of world affairs in recent times has proven to catalyze the rate at which inflation is rising globally. At 4.8% nationally, and 3.18% globally, we are seeing unprecedented figures of the likes of the last recession - something which we can point to the COVID-19 pandemic as being a major contributing factor [16]. In the coming months, we believe that we can expect the inflation rate to keep increasing at a rapid pace.

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January 2022

Emerging use of AI tech in the Real Estate Sector

By Matthew Truong and Akshat Suri; Market Research Analysts

Introduction

In the 21st century, technology has become an integral part of everyone's daily life. This notion has been taking its hold in the real estate sector as well. In recent years, there has been an increasing use of artificial intelligence technology in all aspects of the home buying process. There are now algorithms which can filter through thousands of documents in a matter of minutes to find for you your dream home. The real estate sector has many startup and legacy players in the market trying to control the ever changing market demand and supply. Two of these players are Compass and Zillow, which will be discussed in further details. These two are using AI technology to completely transform the process of finding a house and getting approved for a perfect mortgage.

Proptech (Property Technology)

Proptech is the usage of technology and software to assist in today's real estate needs. Simply put, the goal of proptech is to make everything about owning, leasing, or working in a building unique, easier, and more efficient.

Figure 1

In a nutshell, artificial intelligence helps make educated assumptions about the future using advanced algorithms and predictive analytics, and has developed over the years as technology develops to efficiently collect and store all this information. In the real estate sector, its key uses aren't necessarily replacing human analysis but helping automate part of the legwork when it comes to finding leads, valuing properties, assessing mortgage loans and finding similar properties based on visual searches.

In the past greater uncertainty surrounding the pandemic and economic growth has made companies hesitant towards implementing the technology. Now as restrictions start to ease, there is a growing acceptance of the use of Proptech especially considering its potential growth and development. Like many other sectors, technology use for data analytics has been promising, opening up the way for use of AI to find opportunities (ie. automating the process of looking through deals) [2]

Who are the stakeholders to this change?

Real estate agents are on the lookout for listings in today's ultra-competitive housing market. As the pandemic led to record lows for the supply of sale homes, it contrasted with peaks in buyer demand. As such, AI can be leveraged by agents to find new possible listings based on historical data which suggest which homes are soon likely to be put up on the market. [3] From a buyer's perspective, the property search is much more accelerated and personalized. With real estate sites offering specific filters and pricing estimates, this helps minimize the information disparity between buyers and sellers.

Sub-Industry Insights (Real Estate Companies that implement AI)

Connection Between Company 1 and 2:
Both these companies are AI-based platforms using technological advances to make the real estate process seamless for the agent and client on both the buy and sell sides.

Figure 1

Company #1: Zillow

Coined as a digital real estate company, Zillow Group, Inc. provides its services through its website and mobile applications. Being one of the top online real estate marketplace in the United States, their platform users are able make transactions including buying, selling, renting, and financing services for residential real estate properties; purchase and sell homes; offer title and escrow services, title insurance products and services, and mortgage loans. [4] It also helps its users by calculating and providing an estimated market value of homes under what they call 'Zestimates' through the use of publicly available information Fig 2 [5]

Zillow has been a key player when it comes to utilization of artificial intelligence. Using natural language processing, their 'Zestimate' feature can extract information from text of what people wrote and said about the property when interacting with Zillow's representatives. [6] Similar to how home buyers might judge a property from its photos, computer vision has granted Zillow another rich source of data by mining data from the images associated with a home.

Was AI accurate enough for Zillow?

During Late October 2021, Zillow Class C shares dropped around 30% after shutting down its home buying and selling business, being strongly tied to its overreliance on AI algorithms which showed ineffective in predicting housing prices especially after the pandemic. [7] It reminds us to see where AI is effective and where it has limitations. AI accuracy is based on the assumption that past, and it's data will reoccur, however when paired with the volatility as experienced with the global health pandemic, predictive data may fail.

[8] Figure 2. Zillow Stock (6 months)

Financial Analysis

Recently Zillow Group (Z) beat Q4 estimates and is quickly removing its iBuying business (instant home-buying program that offered an easier alternative to sell your home without the need of a listing. This works as opposed to traditional selling steps since Zillow Offers makes cash offers on homes online, without even seeing them) which lead them towards a double-digit rise in the Zillow's share price. The company's adjusted EBITDA loss of $0.4 million was considerably better than the expected loss of $191 million. The company also said its total write-downs on Zillow Offers were $405 million, $160 million less than expected when it said it was leaving the iBuying business. As for the upcoming future, CEO Rich Barton mentioned Zillow's efforts will be focused on building a "housing super app" which integrates the fragmented process of buying or selling a house. [9]

Figure 3

Company #2: Compass

Compass Inc. is a Cloud based company focused on providing real estate agents in the US the ability to provide services to clients in the housing market. The company utilizes a software program which mainly focuses on client management, marketing, operations, and real estate due diligence to help negate the nuances of the real estate industry. Compass's main revenue driver is the commission based model from the agent. This comes from every commission they make from helping a client buy or sell a home using the Compass platform.

The company will provide specialized aid to their customers to help grow and scale their business. They will provide cost effective advice, and provide professional advisory services to process real estate transactions. This process is made seamless by using AI technology to power and use its analytics capabilities for the client to find the dream home for the customers.

The Compass Platform

The company uses its platform to automate the real estate workflow, and help agents to get more listings and serve more clients. It has a team of over 650 product and engineering professionals based out of its innovation hubs in New York, Seattle, Washington, D.C., and Hyderabad, India. [11]

The product is built to allow for integration and ease of use are foundational to enabling Compass agents to effectively run their businesses and serve clients. The platform works on both mobile devices and allows for easy management. It has consumer-grade user interfaces, automated and simplified workflows for agent-client interactions, and insight-rich dashboards and reports backed by AI and integrated data assets.

The company also provides Concierge, Title, and escrow services via their acquisition of Modus Tech, which helps to enable title and escrow services. While its Concierge services focus on sell side basis to help provide direct investing to the client to get their property ready for sale, and home improvements.

Recent Developments

Forbes reports that the fast-track of property technology in the real estate industry accelerated by 1072% from 2015 to 2019. [12] Other accounts reveal that in 2020, 81% of real estate organizations planned to use new digital technologies in traditional business processes.

What does this mean for investors?

Although proptech doesn't appear to be isn't a wild disruptor to traditional real estate business in the short term, it can be likely that more and more companies and sectors will fund R&D of Proptech, and expect much more informational transparency and accuracy within the real estate market.

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February 2022

TSMC Surpassed Tencent to Become Asia's Most Valuable Stock

By Jarvis Zhang and Tyler Lau: Market Research Analysts

Event and Causes

In December 2021, Taiwan Semiconductor Manufacturing Company (TSMC) overtook China's Tencent Ltd. to be Asia's most valuable company with a market cap of 600 billion USD [2]. Such an event not only speaks to the growing prevalence of the semiconductor market in recent years, but is also representative of the regulatory nightmare that Chinese tech giants have endured since October 2020. Understanding TSMC right now is crucial as most of the world's largest companies heavily rely on the chips they produce. In fact, it wouldn't be a stretch to say that TSMC is the most important supplier of the 21st century.

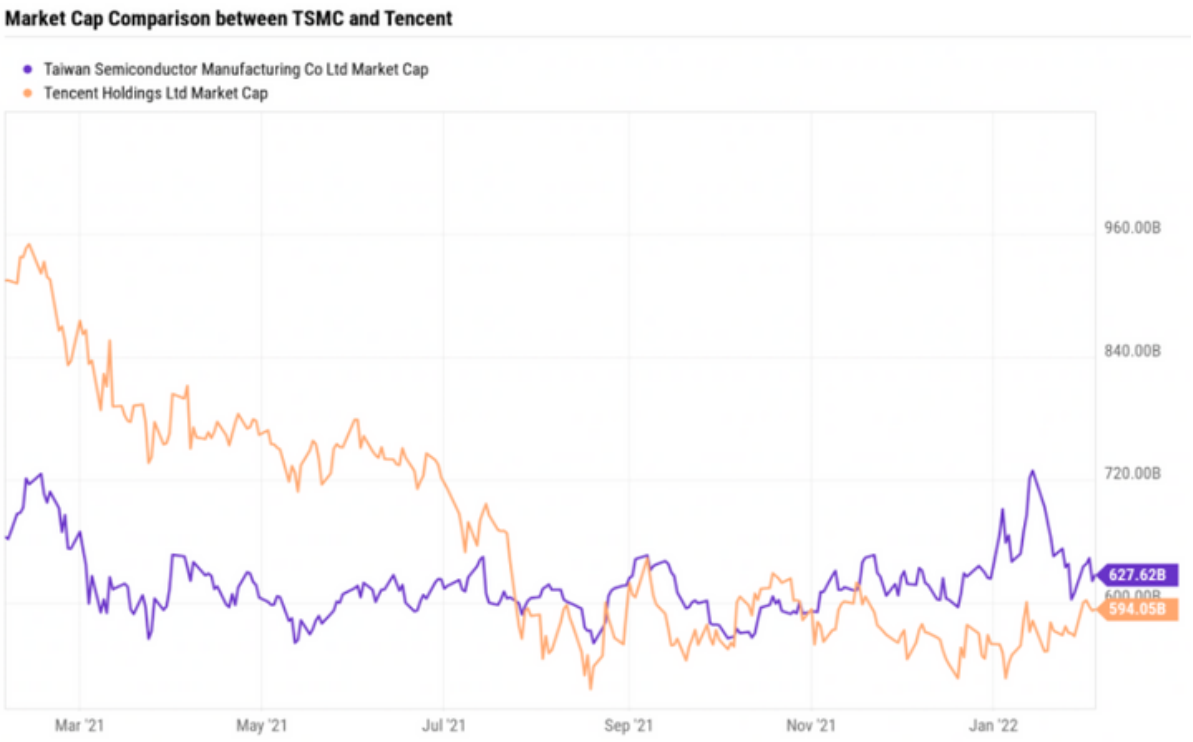

Figure 1 [1]

At its peak in February 2021, Tencent had a market cap of around 916 billion USD [3]. It has since tumbled to half that value after the Chinese government began cracking down on some of the country's biggest companies like Tencent and Alibaba. It was an effort by Xi Jinping's government to promote a "common prosperity" agenda and redistribute wealth. It was also an opportunity for the government to address what it refers to as "social ills." In particular, Beijing has taken its regulatory aim towards industries like online commerce, car-sharing, food delivery, and video games to limit their social influence over Chinese society. Today, Tencent's market cap remains at 590 billion USD [4]. Although it's almost half of what it used to be in February 2021, Tencent is still, by-far, China's most valuable company with Kweichow Moutai and Alibaba coming in second and third.

While Tencent spent 2021 dealing with a political quagmire, TSMC flourished along with the rest of the semiconductor market. Rises in chip prices were fueled by growing demand from electronic producers who were looking for chips to power through consumer goods. Furthermore, COVID-19 restrictions disturbed supply-chains around the globe and made producers increasingly desperate for essential electronic parts for their products. Since March 2019, TSMC has doubled quarterly revenues and the company's stock price has nearly tripled in the same time [5].

What is TSMC?

TSMC is a semiconductor manufacturer that mainly operates in Taiwan. The company was founded in 1987 and rose to prominence thanks to its unique foundry business model. Unlike other companies in the industry, TSMC does not develop any of its own chips and solely focuses on manufacturing semiconductors designed by its customers. Because of this choice to not design their own chips, TSMC was able to develop partnerships with some of the world's largest manufacturers and now works with companies like Apple, Qualcomm, AMD, Nvidia, and Intel to satiate the world's growing hunger for semiconductors.

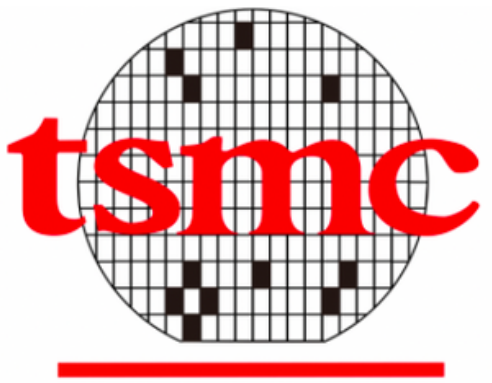

Figure 2 [6]

Thanks to TSMC and its focus on manufacturing, the company now dominates the semiconductor market and produces 54% of the world's total supply [7]. It has also allowed the tiny island of Taiwan to assert itself as a titan in the world of advanced manufacturing and technological development.

What is Tencent?

Tencent is a massive Chinese technological and entertainment conglomerate. The company was founded in 1998 in Shenzhen, China and rose to popularity thanks to its instant messaging service, QQ. Since then, the company has expanded itself into many different markets and now dominates the Chinese digital and entertainment space. For example, Tencent owns WeChat, a social messaging app that has 1.24 billion users in China [9] and across the world. It also operates Tencent Video, one of China's largest video streaming platforms.

Tencent is also a media giant that has its own production companies, animation studios, sports broadcasting networks, and video game publishers. For example, Tencent Games owns the studios behind massive titles like League of Legends, Valorant, and PUBG. The company also has a 48% stake in Epic Games, the popular game publisher well known for creating the Unreal Game Engine and Fortnite [10]. This is one of the many industries that Tencent has asserted itself into and its massive portfolio of businesses has allowed it to be China's most valuable company at 585 billion USD as of February 7th, 2022 [11].

Figure 3 [8]

Semiconductor Foundry Industry Overview

As the brain of modern electronics, semiconductor chips are increasingly demanded by all kinds of industries, such as computers (CPUs/GPUs), automobiles (EVs) and cloud computing (AWS). Such great demand boosted the semiconductor foundry industry , where TSMC is categorized under. Firms in this industry are located in the downstream chain of semiconductor chips; they do not design their own ones, but manufacture those for chip designers and sellers. Given this outsourcing business nature, semiconductor foundry can not only perfectly avoid direct competition against giant chip designers like Nvidia or Apple, but also thrive based on their gigantic product sales.

Moreover, the COVID pandemic, the rise of Electric Vehicles and the China-US Trade War, caused a global chip shortage. This further encouraged the sales and expansion of the semiconductor foundry. The whole market was valued at $83.32 billion in 2020, and is now expected to reach $126.91 billion by 2026 with a CAGR of 7.3% [12]. According to Statista in Q3 2021, TSMC has achieved an overwhelming advantage with more than half (53%) of the market share, far higher than its largest competitor Samsung Electronics (17%). This shows just how dominant TSMC is in this industry.

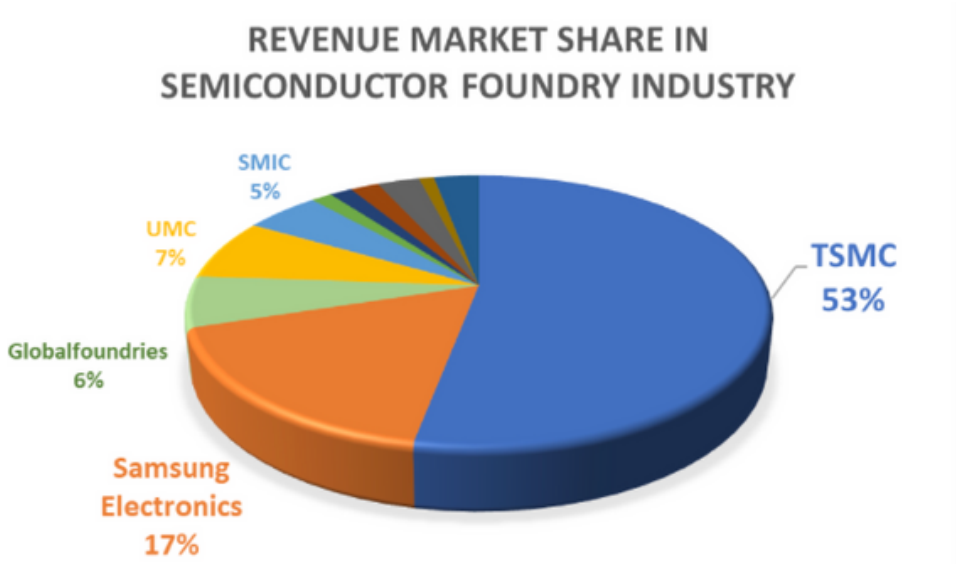

Figure 4 [13]

Recent Developments

In the semiconductor foundry industry, a very important strategic advantage is having a small technology node. This concept relates to the physical size of the transistor within a chip. The smaller they are, the more of them can be contained in the same area, which leads to faster switching, less energy consumption, and a cooler running temperature. The following is a graph that describes the timeline of the technology node evolution:

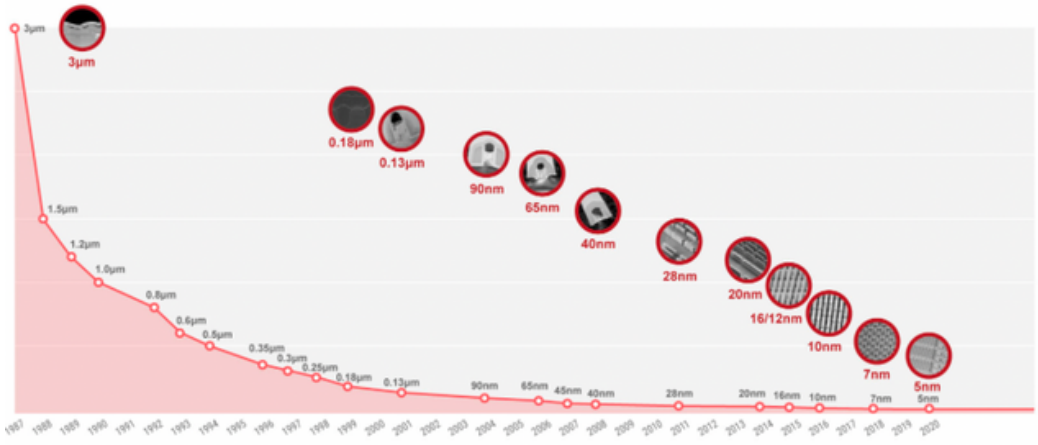

Figure 5 [14]

Currently, for those that have been in mass production, 5nm is the most cutting-edge technology node, with the Apple M1 as a typical example. TSMC also played a revolutionary role in developing newer generations of the technological node. For instance, its latest 3nm chips have been in the final testing stage by major clients.

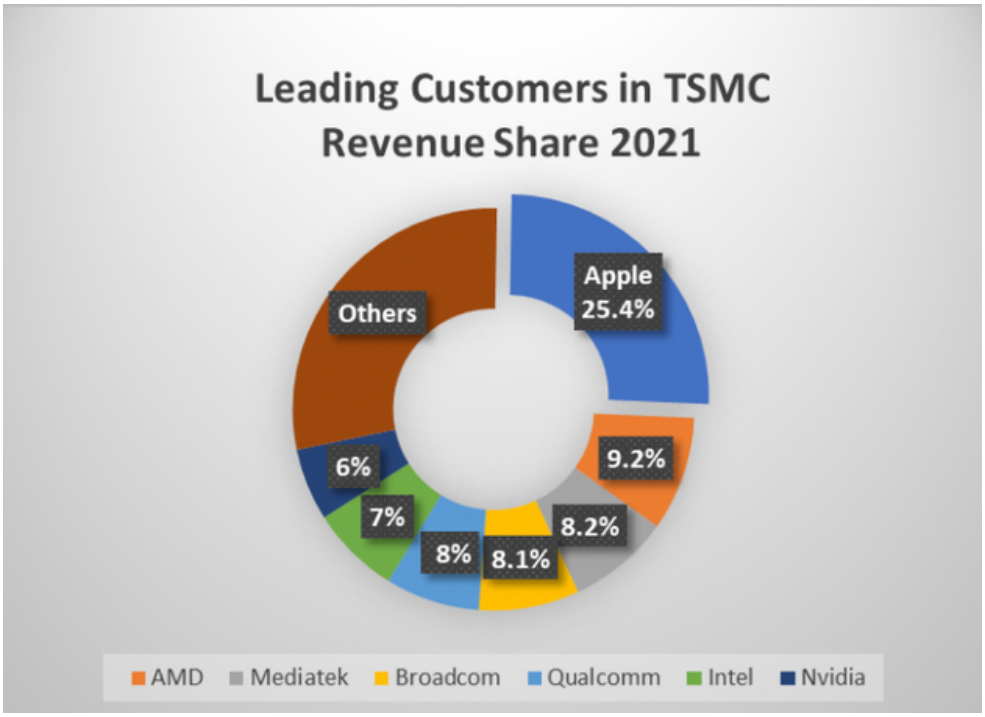

Figure 6 [15]

Speaking of major clients, Apple is always the closest partner of TSMC. During 2021, Apple has directly contributed over 25% of TSMC's revenue, worth nearly $15 billion in total. Also, many other famous firms have close cooperation and substantial reliance on TSMC.

Fundamental Analysis

Growth Factor: Market for Semiconductors

Thanks to its large clientele of high-profile companies, TSMC is poised to remain in its dominant position for several years. With the increasing complexity and demand for modern silicon, it is impractical for fabless companies (companies who don't manufacture their own chips) to start. Apple is one such example and the company will continue to rely on TSMC's expertise and manufacturing capacity to supply its cutting edge M1 and A15 chips. Even competitors within the semiconductor industry like Nvidia, Intel, and AMD depend on TSMC to supply a large portion of its integrated processors. Since these companies are expected to grow at fast rates, TSMC's revenue stream should continue to grow in line with these companies.

Besides creating chips for consumer electronics and computer equipment, TSMC will also benefit from the accelerated digitalization of various consumer products. For example, the average modern car now has around 3000 chips to power the various digital and computerized systems onboard [16]. To respond to this heightened demand, TSMC increased its auto-chip production by 60% in 2021 [17].

Growth Factor: Technology

A large part of a chip's processing power comes from its transistor density. Transistors are the basic building blocks of any integrated chip so being able to fit more of them into a smaller space is key for improving processing power. To do so, semiconductor companies like TSMC, Samsung, and Intel have been racing to find effective ways to manufacture smaller transistor nodes. Currently, TSMC is developing methods to produce chips with 3nm (nanometer) nodes and plans to start production in late 2022 [18]. According to the company itself, 3nm nodes will be an improvement over its 5nm predecessor by increasing logic density by 70% and performance by 15% [19].

Miniaturizing the modern transistor is no easy task and each subsequent upgrade becomes increasingly difficult and expensive. Entering this industry is near impossible today and even established giants like Intel are struggling to keep up. As long as TSMC stays on top of the bleeding edge of chip manufacturing, high barriers to entry will solidify the company's place in the semiconductor industry.

Risk Factor: Geo-politics

With such sky-high potential, what could hold the company back? For one, the current geo-politcal situation around China and Taiwan has definitely raised some questions about the company's future stability. 14 of TSMC's 17 fabs (manufacturing facilities) are located in Taiwan and the vast majority of the company's engineers live there [20]. As such, the US and China have made several political, economic, and military efforts to secure the island's silicone production for technological supremacy.

TSMC, for their part, has tried to play both sides. They need China for its future growth and the US for its technology and large customer base. The company currently operates two fabs in China and plans to have two in the US by 2024 [21]. By opening fabs in China, TSMC hopes to satisfy Beijing's desire to expand the country's advanced manufacturing prowess. On the other side of the Pacific, TSMC's two fabs in the US are an effort to expand beyond the Asian market and help the company easily reach its American customers like Apple.

The effectiveness of these efforts are yet to be seen and the tension between the US and China has yet to cool even after President Trump left office. By staying in the good graces of both nations, TSMC hopes to dodge any future sanctions that could come with another trade conflict.

Financial Analysis

In terms of financial perspectives, TSMC's data remains impressive all the way along. It is the only foundry that consistently delivered 17.5% revenue CAGR and 17.1% earnings CAGR since listing in 1994. Despite the shock on the supply chain caused by the pandemic, TSMC's strongest market position and leading role in technology innovation enabled itself to confidently announce ambitious future objectives: (1) revenue CAGR to be between 15% to 20% from 2021 to 2026 in U.S. dollar terms; (2) gross margin to be 53% and higher and ROE to be above 25%. [22]

Despite TSMC having a significantly higher market cap than competitors, it manages to outperform the industry with respect to certain key comparable indicators. For example, the industry's Price-to-Sales ratio is around 12, which is 20% more inflated than TSMC's 10, further showing its dominant market share. Moreover, its P/E ratio remains under 30, while the industry's has risen over 44%. The same advantage about profitability also gets proven in Net Profit margin, where TSMC achieves 37.61% while the whole industry is still limited at 26% [23].

At last, TSMC keeps generating very healthy cash flows to maintain internally sustainable operation and R&D investments (about 85% of worldwide semiconductor start-up product prototypes were enabled by TSMC), and to minimize investors' concerns about debts. For example, TSMC's D/E ratio is as low as 33% (28% LT), while the whole industry is holding a much higher financial leverage at 63% (59% LT). Meanwhile, little pressure on debt and abundant cash flows encourage TSMC to maintain their dividend per share since 2004, and to pay $9.5 billion cash dividends in 2021 [23].

Conclusion

All in all, TSMC's dominant market share, continued focus on innovation, and healthy financial state has turned it into one of the most valuable companies in the world. However, we should never be too optimistic. The company is still experiencing supply chain challenges caused by COVID-19, and carries risks from increasing geo-political tensions in Asia. Therefore, its short-term performance may not be a skiller in the market. Nevertheless, in the long run, it still is a member of the most high-quality investment targets. The company's success is representative of the industry's overall prosperity and the world's growing hunger for semiconductors.

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Oil vs. EV? The Play of the Future!

By Eric Lai and Sharv Parikh: Market Research Analysts

Introduction

Oil is one of the most important resources in the world that fuels many of the activities in our daily lives. It can be used in the form of natural gas to heat buildings, everyday products such as lipstick, and in life-saving medical devices. The most common use for oil comes in the form of gasoline that we use for transportation.

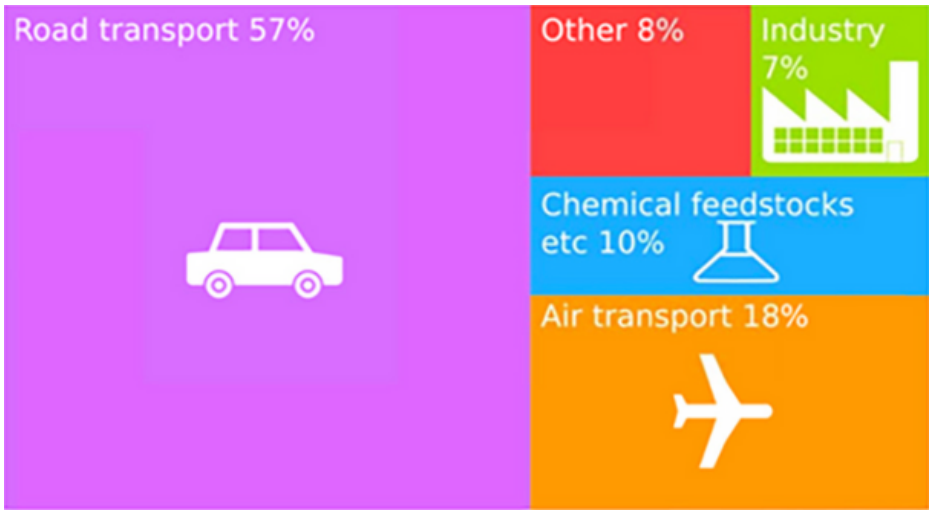

Figure 1 [1]

Although oil has provided us a way for quick and efficient travel for many years, it is important to be forward-looking and analyze whether or not this is a sustainable method of transportation in the long term.

In the last couple of years, we have seen more and more electric vehicles on the roads. In addition, there has been a trend of investment in EV companies that are growing, starting to turn profits and are highly volatile. This is a contrast to oil giants which consist of mature companies with stable returns, dividends and lower volatility.

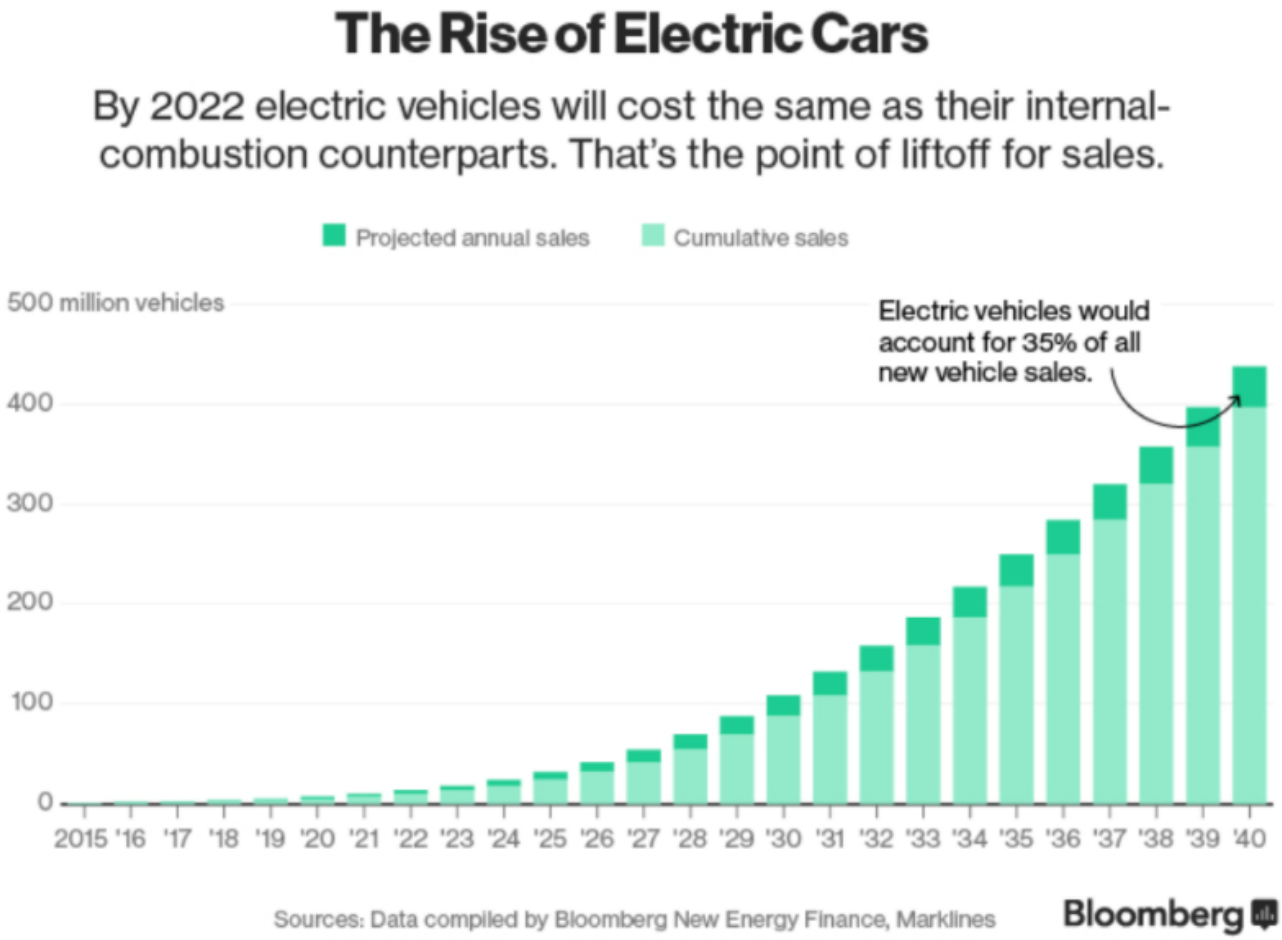

Figure 2 [2]

Oil in the Transportation Industry

You may have noticed that gas prices in the Toronto area hit record highs in the first week of February, hitting almost $1.55 per litre. The high oil prices can be problematic, as it contributes to inflation in the economy, increased transportation costs and lowered standard of living. In general, high oil prices are caused by high demand, low supply or a drop in dollar value [3]. In order to grasp a stronger understanding of the main drivers of rising oil prices, we can look at historical data for the benchmark of oil price per barrel.

The West Texas Intermediate (WTI) crude oil is considered as one of the three main benchmarks in oil pricing [4]. The prices from the WTI can be used as an important indicator of oil futures contracts for speculative or hedging purposes.

Figure 3 [5]: WTI Crude Oil - 5 year chart of daily closing prices

In Figure 3, we observe that the price of crude oil started dropping at the beginning of 2020 and hit a 5-year low around April 2020. This can be explained by the reduction in mobility across multiple sectors of the transportation industry after the initial lockdown restrictions (i.e. stay-at-home orders, closure of various amenities and services) of the COVID-19 pandemic.The unprecedented nature of the event resulted in excess supply of oil at the time as consumer demand fell to a stand still.

Although oil production and consumption dropped sharply in 2020, increased COVID-19 vaccination rates and easing of pandemic-related restrictions in 2021 stimulated economic growth. Crude oil prices have increased in 2021 and are forecasted to remain near current levels in 2022. This trend is occurring due to the global crude oil demand outpacing supply. Oil demand can be cyclical because of seasonal changes. There is a higher propensity to travel during the spring and summer, increasing the demand for oil for transportation purposes. Meanwhile, a lot of natural gas is used for heating households in the winter months. High demand for oil is mainly driven by supply shortage.

A shortage in the supply of oil can be attributed to underinvestment from both investors and the government. In addition, the supply shortage is also driven by political instability. Russia has launched an invasion on Ukraine, which may disrupt the energy supply as Ukraine is an important transit country for resources in Europe. Furthermore, Russia is holding back its supply of natural gas, leading to dependent European countries to turn to the United States, causing prices to increase.

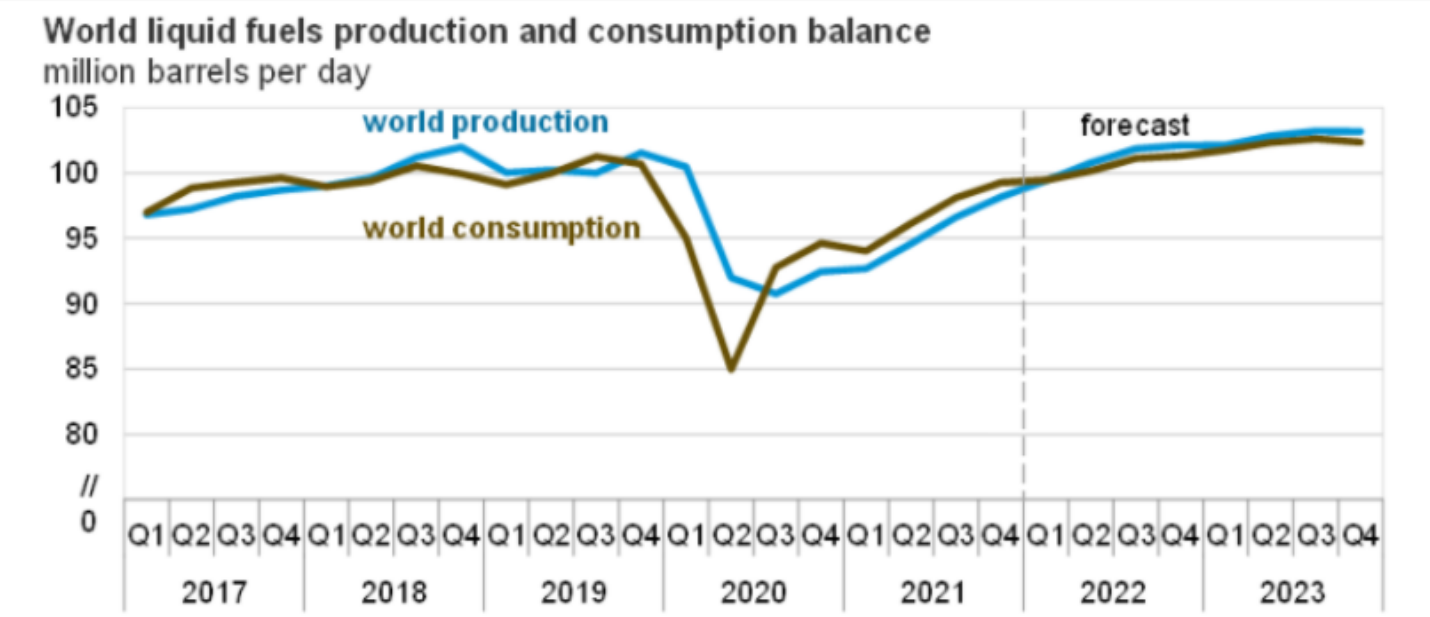

Figure 4 [6]: 5-year historical & 2-year forecast of world production and consumption of liquid fuels

Looking at both Figure 3 and Figure 4, we see low oil prices occur when there is high production and low consumption. In contrast, high oil prices occur when there is lower production than consumption. Instability occurs in the economy when there is a large discrepancy between production and consumption. Although the forecast shows the production and consumption lines to be close together, we have seen that the oil supply and demand is highly sensitive to market factors. Overall, worldwide political events and the status of the Omicron variant can have a large impact on industry forecasts.

Environmental Considerations

In addition to the cost inefficiencies, there are also many environmental drawbacks of extracting oil and using gasoline as a method of transportation. Every year, the United States alone is responsible for 1.7 billion tons of carbon dioxide released into the atmosphere from the tailpipes of gas-powered cars, according to the Environmental Protection Agency [7]. The production of C02 when burned contributes to pollution, smog and global warming which can have detrimental effects on the environment in the long term.

From the perspective of investors, the emergence of environment, social, and governance (ESG) considerations for strategic and investment plans can have adverse effects on the oil and gas industry. In addition, on November 4, 2021, the Canadian government committed to ending the financing of international fossil fuel projects starting in 2022. If fully implemented , it could mean a shift of over $20 billion collectively out of fossil fuels into clean energy -- and the funds will continue to grow as more nations sign the pledge [8].

It is important to note that oil is a non-renewable energy source. More specifically, it cannot be replenished at the same rate that it is consumed. Overall, the sustainability of oil-fueled cars as a long-term solution is brought into question because of the cost inefficiency and environmental concerns.

This motivates the discussion about the meteoric rise of electric vehicles (EV). The following section will give a brief introduction to EVs and provide an outlook on the industry. Furthermore, there will be a discussion on whether it has the potential to solve the underlying problems in the transportation industry if EVs were to replace gasoline-fueled cars.

EV Industry Introduction

Electric Vehicles – commonly referred to as EVs – are vehicles that run with electricity-powered engines rather than the standard internal combustion engine (ICE) models. There are three major types of electric vehicles: The first type of vehicle introduced in the 1990's was the hybrid electric vehicle (HEV) that combines the ICE with an electric motor that uses energy stored in batteries. This type of vehicle activates the electric motor during periods when ICE is most inefficient. The second type of vehicle is the Plug-in Hybrid Electric Vehicle (PHEV) that again combines an electric motor and battery pack. The major distinction between a PHEV and HEV is that the driver has a choice to switch between electric and traditional for PHEV whereas drivers do not have this choice for a HEV. The last is the Battery Electric Vehicle (BEV) and is a full electric vehicle that does not have an ICE combustion. This type of car needs to have a charged battery and does not run-on fuel [9].

According to Allied Market Research, the global EV market was valued at $163.01 billion in 2020 and is expected to grow at a CAGR of 18.2% till 2030 to reach $823.75 billion [10]. The Covid-19 pandemic has weighed down the industry with new EV vehicle registrations dropping by 20% in FY21 from previous year [10].

Going Green with EV's

President Biden has repeatedly stated the need for the U.S to transition away from the oil industry and into renewables. U.S transportation fuel consumption accounts for over 70% of total U.S. oil consumption, out of which 65% is from personal vehicles [11]. As a result, electrification of the roads in the U.S is paramount to achieve this goal. The figure below shows the tailpipe emissions from each type of vehicle.

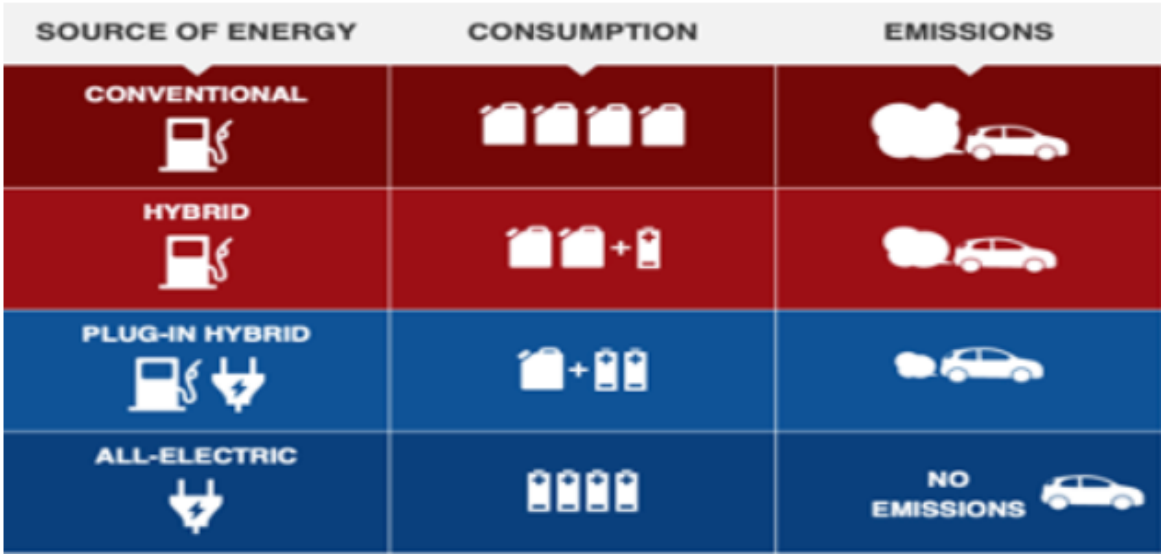

Figure 5 [13]: Source of energy and tailpipe emission

Now even though tailpipe emissions are zero, electric vehicles do leave a carbon footprint. This is due to the fact that electric vehicles need to be charged by electricity, which is still largely produced by fossil fuels. Seeing the figure below, CO2 emissions related to electric vehicles can further be reduced because electricity generation becomes cleaner as new methods are developed.

Figure 6: [14] Average emissions of carbon dioxide (in kilograms) per 100 kilometers

EV Future Outlook

With our environment deteriorating day by day, people are looking to invest in companies that are not only financially attractive, but also provide sustainability. ESG investing refers to investing in companies that provide some form of benefit for these factors. This type of investing has gained momentum with a record $649 billion poured into ESG-focused funds worldwide through Nov. 30, 2021 [10]. This is up from $542 billion in 2020, an increase of almost 20%. The EV industry will ride the secular trend of ESG investing.

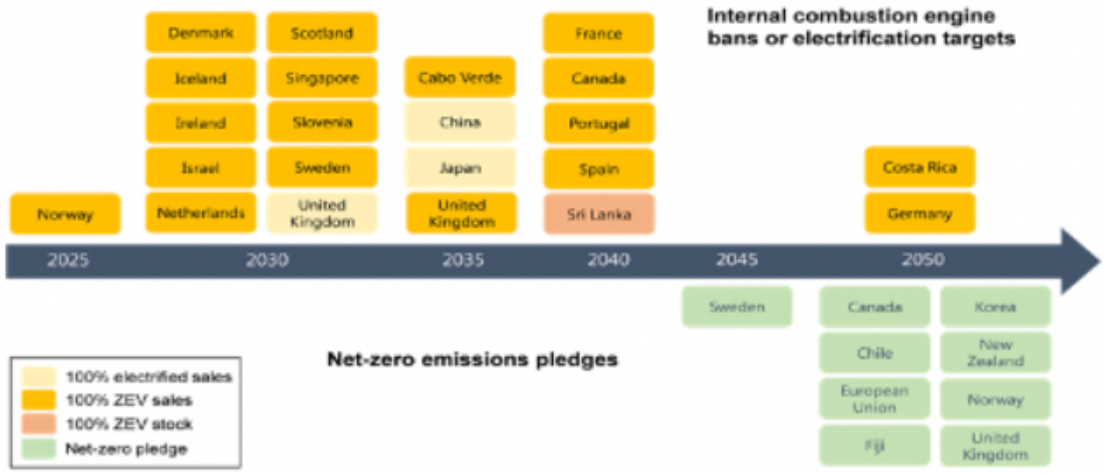

Figure 7 [15]: Timeline of countries for achieving their EV goals

The chart above shows the number of countries and their timeline of achieving their EV goals. This shows how the demand for electric vehicles is going to increase over the years as more people will be using more environmentally friendly vehicles.

There is still a distance for these countries to go to achieve their targets as infrastructure needs to be in place for these cars to function effectively. First off is the need for creation of more charging stations. As seen in the figure below, the ratio of the number of electric cars to charging points is high in several countries. Another important point for countries to achieve their targets is the development of this infrastructure in the smaller cities/ regions as well. If the development is concentrated in only well-developed areas, adoption will be lower from individuals in smaller cities.

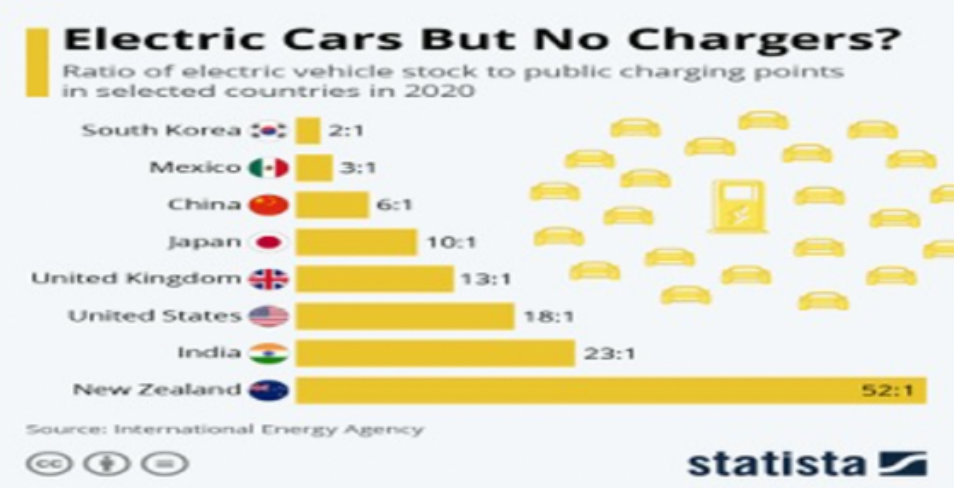

Figure 8 [16]: Electric Cars but no Chargers

EV Top Players

Here are some of the top players in the industry that provide exposure into the EV space:

Tesla (NASDAQ: TSLA): Probably the company that makes the most headlines in the EV space is Tesla. The company designs, manufactures and sells electric vehicles. The company has played a major role in providing the transition to EV's by providing high quality and fashionable vehicles. It is the most valuable carmaker by market cap and has delivered 936,000 electric cars in 2021 – almost double the number from 2020 [17].

Nio (NYSE: NIO): NIO is a Chinese company that trades on the U.S stock exchange and is involved in manufacturing and selling electric vehicles and its parts. The company has a market cap of $37 billion.

Livent Corp (NYSE: LTHM): Another indirect way to gain exposure to the EV industry is through investing in companies that produce and distribute lithium. Since EV batteries are lithium-based, they are essential to produce EVs and the price of lithium directly impacts the price of EV vehicles. The company produces lithium not only to produce batteries but for other applications such as polymers, aerospace alloys and various industrial applications.

Conclusion

Oil-fueled solutions have been the primary method of transportation for many years. However, cost considerations and environmental concerns have driven the need for transition into a different space.

As seen from our analysis, EVs are expected to take up a larger market share of the transportation sector in the future. This is further evidenced by government support towards EVs through tax benefits and quotas to further the green initiative. As referenced earlier, we see as governments are transitioning into the EV space, their prices will gradually decrease with increased production efficiency. However, this is a gradual process and not a change that will happen overnight. From Figure 2, we see that electric vehicles are projected to account for 35% of all vehicle sales globally by 2040. As a result, we feel like the EV is the play of the future.

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