

MARKET Recap

The US Economy: “Inflation at All Costs”

Productive activity has clearly rebounded following the initial COVID shock. The most recent Atlanta Fed’s GDPNow projection put Q3 annualized growth at 34.6%, following a contraction of -31.7% for Q2. Annualized figures do tend to over-dramatize the event. Also, note that negative percentage changes are more impactful than positive ones – growth of 46.4% is needed to offset a contraction of -31.7%.

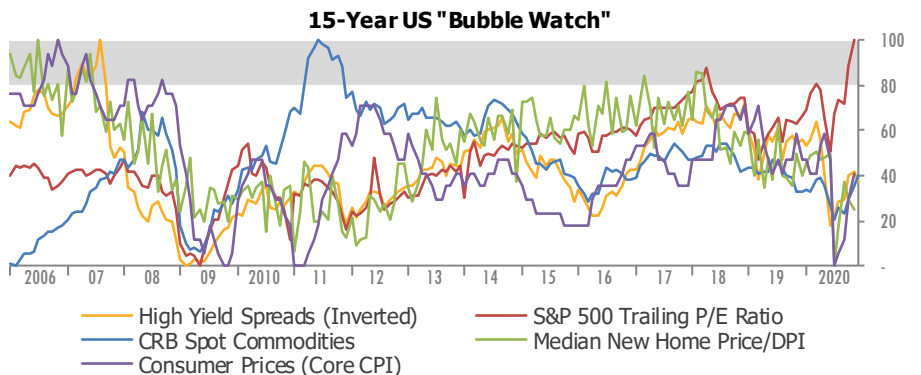
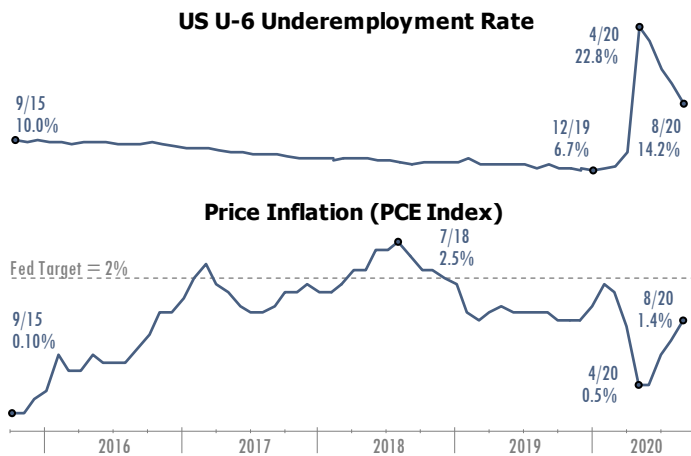
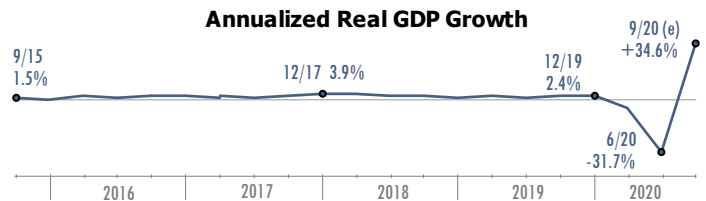
Nonetheless, it is clear that adaptive behaviors and gradual re-opening has contributed to a snap-back recovery, with results varying greatly by industry. Tech and healthcare continue to win big, while restaurants, travel, and retail continue to struggle. Manufacturing has fared well for the most part, adapting channels as required, but discretionary retail spending (e.g., clothing) remains depressed. Consumer activity is tentative, in part due to uncertainty over continued aid programs. Expiration of the \$600 weekly federal emergency unemployment supplement on July 31, which was replaced by executive order with a \$300 program, resulted in a 3.2% decrease in disposable personal income.

While Congress was idle, the Federal Reserve was active. Monetary policy remained very accommodative and there was a noteworthy uptick in posturing. In August, the Fed amended their statement of longer-run policy goals to note that, in order to achieve 2% inflation in the long run, it will be necessary to maintain a rate of inflation moderately above 2% for some time – deliberately overshooting their target.

One senses a certain degree of frustration in the press conference following the September 15-16 meeting, as consumer price inflation has defied the Bank’s best efforts. Chairman Powell summarized the problem well: “... these are lending powers, not spending powers. The Fed cannot grant money to particular beneficiaries. We can only create programs or facilities with broad-based eligibility to make loans to solvent entities with the expectation that the loans will be repaid.”

The Fed creates and distributes money through lending, but the market decides where that money (and its associated inflation) ends up. It follows the path of least resistance, and currently that path leads to the stock market, not the mall. Other assets face fundamental impediments, e.g., urban flight and office closures for real estate. Consumers face greater barriers as well, the most significant of which is fear; it is in the nature of consumers to respond to uncertainty with conservation and savings, not with spending. Fear and dislocation still abound, and each incremental displaced job becomes harder to restore as people are recalled to the least impacted jobs first. Blunt monetary stimulus cannot reshape a workforce.

Lacking options, we expect that the Fed will continue stimulus as they’ve foreshadowed, regardless of lofty stock valuations, until consumer prices give way. This time they seem determined to do whatever it takes to move inflation beyond 2% and keep it there. There’s an old adage, “with a big enough engine you can make a barn door fly.” Landing, now that’s another matter.



Values indexed to 15-year high = 100. Years ending 9/30.

The US Bond Market

The yield curve was little changed from the end of Q2 to the end of Q3. The only noticeable movement has been modest downward pressure at the very front of the curve as investors continue to park their money in US Treasury bills. Bulls will note a slope that is decidedly steeper compared to one year ago, but not so steep as to presage inflation dangers; bears will console themselves with the less-than-optimistic level of yields.

It is clear why short-term rates have locked into near-zero yields for the foreseeable future, as the Fed foresees zero interest rate policy (ZIRP) extending through at least 2023. A more puzzling question is, why does the 30-year rate refuse to budge off its pandemic flight-to-safety low? A longstanding ZIRP coupled with multiple rounds of trillion-dollar fiscal stimulus should give inflation fears some credence going forward. Yet, the 30-year key rate has ranged from just 1.19% to 1.52% in the third quarter. Such a yield is high-impossible to rationalize even without building in an inflation risk premium. The only obvious rationale to offer is that the perceived inflation risk is outweighed by the alternative perceived risks in equity and credit – and lack of adequate compensation thereof.

US Bond Index Returns	
Bloomberg Barclays	3Q20
Aggregate	0.62%
Short Gov't	0.08%
Interm. Gov't	0.20%
Long Gov't	0.13%
TIPS	3.03%
Municipal	1.23%
Interm. Credit	1.24%
Long Credit	1.97%
High Yield	4.60%
(CS) Lev. Loan	9.71%
MBS	0.11%

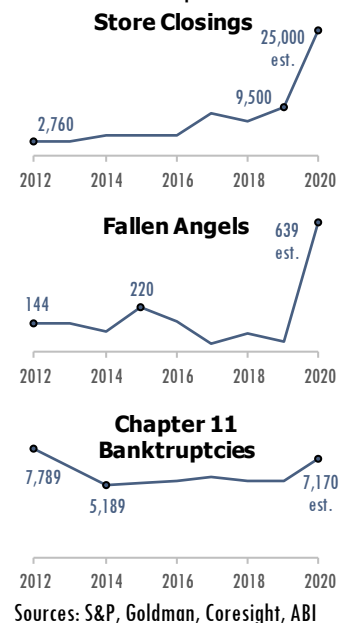
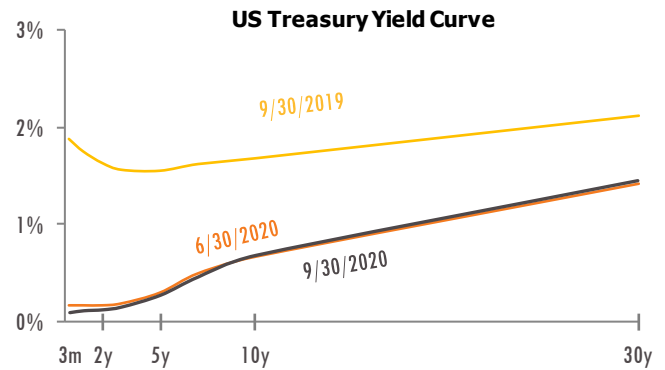
Credit spreads contracted in steady course throughout July, hitting a trough in early September. Quarter-over-quarter, high-yield spreads narrowed 103 basis points to close Q3 at 5.41%. This puts high-yield credit spreads 38 basis points below the 20-year long term average. And, this holds roughly across the credit quality spectrum. The US bond market's recovery is forming a tentative V-shape. The spread tightening signals even stronger optimism taking into account the ample new corporate bond issuance flowing into the market. Both investment-grade and high-yield issuance through Q3 this year are running around 70% above the usual pace.

As of June 16th, the Secondary Market Corporate Credit Facility (SMCCF) held \$6.8 billion in ETFs, with 12% being high yield. Despite its expansion to include individual corporate bond purchases, the SMCCF has only grown to a total outstanding of \$12.9 billion, well below its \$250 billion capacity. The complementary Primary Market Corporate Credit Facility (PMCCF) has yet to purchase any new bond or loan issuance, despite its larger capacity of \$500 billion.

Spread tightening, underusage of the Fed facilities, and positive returns for a second consecutive quarter across the major US bond indices seem to confirm that the worst of the pandemic fallout is behind us. Yet, America is in the midst of a second wave of business closures and bankruptcies whose crest has yet to appear on the horizon. Data from Yelp shows that close to 177,000 of the 4.9 million businesses listed as open March 1st were shuttered on April 15th. This bottomed out near 133,000 in July before rising to almost 164,000 at the end of August. More concerning is that the number of permanent business closures keeps increasing and has grown to represent 60% of the total.

Through September 7th, 470 companies with public debt or equity had filed for bankruptcy this year, according to S&P Global. This marks the greatest total for the period since 2010. In the first and second quarters, the bulk of bankruptcies and credit downgrades hit companies that were headed in that direction already, their fates sped by the pandemic. Although total bankruptcies have run behind the normal monthly pace this year, Chapter 11 bankruptcies are elevated. Q3 has claimed many companies that were thriving before social distancing became the new norm. The next two quarters may claim many more.

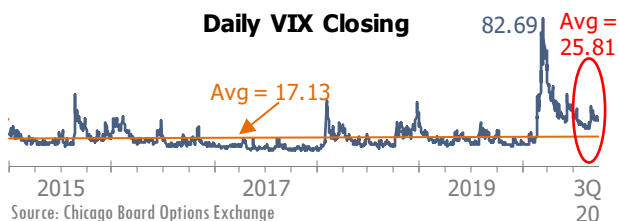
Restaurants, retailers, salons, gyms, airlines, and many other businesses may face long-lived headwinds. A survey performed by PYMNTS found that 24.7 million Americans are done with dining out at restaurants even after the pandemic is over. Estimates for eventual closures of independent restaurants run up to a shocking 85%, though perhaps more reliably (but still concerning) 40-50%. Air travel is projected to bounce back to pre-pandemic numbers by 2022, but businesses may hesitate to ramp up their travel budgets. The companies that survive the pandemic fallout may find ample opportunity for growth once vaccinations are commonplace, but that's little solace to the fixed income investor.



The US Stock Market

The US stock market turned in a solid quarter overall, with investors heartened by a steadily-improving economy and upticks in consumer spending and hiring. Although major indices posted returns that were less than half of the heady levels seen in Q2, it was enough for broad-market and large-cap indices to join their growth counterparts in erasing the negative performance from earlier in the year. The Nasdaq Composite returned over 11% for the quarter and over 45% for 6 months, its best 2-quarter period since 2000.

However, it was not rosy across the board. Small- and mid-cap core and value benchmarks are still negative YTD. And while growth outpaced its value counterparts for the quarter, September saw a rotation to value in the Russell 3000 and Russell 1000. The final month of Q3 also saw returns go negative across the major benchmarks and through most industry sectors. In addition, the S&P 500 and the Nasdaq Composite flirted with corrections as the momentum that fueled tech stocks through August reversed. Historically, September is one of the worst months for US stock performance. Even so, the Dow



Jones Industrial Average, the Nasdaq Composite and the S&P 500 posted their lowest September returns since 2011. September also saw market volatility climb, with the Nasdaq Composite, the S&P 500 and the DJIA each moving more than 1% per day in the week following Labor Day. Congress's inability to agree on the next round of stimulus, dominating valuations in a handful of tech stocks, and the looming presidential election fueled investor concern. The CBOE Volatility Index (VIX) dropped below 25 in late July, staying in the low 20's through August, only to cross back in September. Volatile markets are generally thought to benefit active strategies, providing greater opportunity for differentiated performance from indexed counterparts.

Nowhere was volatility more evident than in the energy sector, which returned to the bottom of the table after a Q2 rally and was the only sector in the S&P 1500 to post a negative return. The 10 worst performers in the S&P 500 for Q3 were all in the energy sector, as it struggled to achieve supply/demand balance. Interestingly, in smallcaps, energy was a strong performer in the Russell 2000 in July and August, driven by transportation and distribution activity. Within financials, banks also had a tough go. Any hope for a rate increase evaporated as the Fed announced it would keep its policy interest rate near zero until "maximum employment" is reached by labor markets and inflation "is on track to moderately exceed 2% for some time." The Fed delivered more bad news with its announcement that the ability to withstand two coronavirus-related recessions would be part of stress tests to be conducted later this year and that existing limits on bank stock buybacks and dividends may be extended into Q4.

Bright spots included the consumer discretionary sector, where home builders did especially well. Confronting an extension of the work-from-home model, workers and families are spurring a housing boom in some markets as they look for more living space. Materials also fared well, with government stimulus, central bank liquidity, and a falling dollar providing support. Finally, while consumer staples and utilities produced returns that put them in the middle of the table, they outperformed their Q2 returns as enthusiasm for info tech names abated.

Earnings growth in Q3 for S&P 500 companies is predicted to come in at -21.2% YoY. If this materializes, it will be the second largest decline since Q2 2009, behind Q2 2020's -31.6%. It will also be the sixth YoY decline in the last 7 quarters. Revenue growth for these firms is expected to be -3.6% YoY, well below the 5-year average of 3.4% [FactSet].

The IPO market saw an upsurge in activity, putting 2020 on pace to record territory. Proceeds raised Q3 YTD total nearly \$95 billion. The IPO market is concentrated, with deals largely spread across health care, technology, and "blank-check" or special-purpose acquisition companies (SPACs). Formed to acquire private companies and take them public, SPACs account for over 40% of IPO funds raised in 2020 so far [Dealogic].

US Stock Indices - Total Returns			
Large-cap Stocks	3Q20	Mid-cap Stocks	3Q20
S&P 500	8.93%	S&P Midcap 400	4.77%
Russell 1000	9.47%	Russell Midcap	7.46%
Growth	13.22%	Growth	9.37%
Value	5.59%	Value	6.40%
Broad Markets		Small-cap Stocks	
S&P 1500	8.56%	S&P Smallcap 600	3.17%
Russell 3000	9.21%	Russell 2000	4.93%
Growth	12.86%	Growth	7.16%
Value	5.42%	Value	2.56%

S&P 1500 Economic Group Components - Total Returns		
Sector		3Q20
Consumer Disc.	14.97%	
Materials	12.04%	
Industrials	11.95%	
Info Tech	11.58%	
Consumer Staples	10.27%	
Comm. Services	8.76%	
Health Care	5.83%	
Utilities	5.11%	
Financials	3.58%	
Real Estate	1.05%	
Energy	-19.22%	

Source: Morningstar

International Markets

Momentum from the second quarter continued to drive risk assets higher through July and August. Despite a second wave of COVID-19 infections in Europe in September, global equity indices shook off the added volatility and ended the quarter in positive territory.

Emerging markets benefited from a weaker US dollar and recovering commodity prices. China's swift economic rebound propelled its equity markets to all-time highs and drove EM outperformance. With developed sovereign and credit yields compressing to pre-pandemic levels, 3Q witnessed growing investor interest in EM credit. Particularly noteworthy was the demand for riskier, high yield credit; investors were willing to accept the elevated risk of default for yields in the range of 6.5-7.0%.

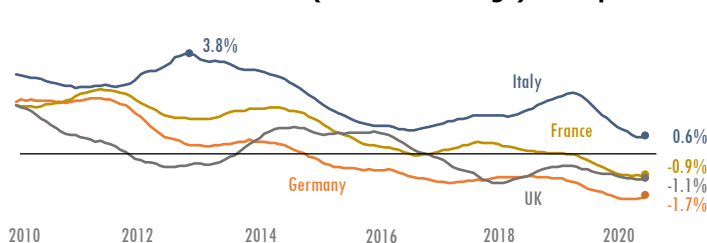
Europe

European equities lagged global peers in Q3. A wide miss on inflation in August and slowing signs of recovery hampered returns late in the quarter. One of the weakest performers has been the UK, which makes up over 20% of European market capitalization and ended September down 23% YTD. The UK economy contracted by almost one-fifth in Q2. Since restrictions were lifted, activity rebounded sharply, and GDP grew at a record 6.6% (MoM) in July. But with infections jumping in September, economists expect GDP to stagnate at 4-7% below pre-COVID levels due to renewed restrictions.

The softening economic outlook, coupled with a Brexit logjam, led to negative returns for UK equities in the third quarter. Another factor contributing to the UK's underperformance is the composition of its equity markets – financials and energy together make up almost 30% of the FTSE 100, while technology is a minuscule 1.4%. Conversely, Germany's DAX index (which has a higher weight of 13.8% in technology) posted strong gains in Q3 and ended the quarter with positive YTD returns. German equities also benefited from a smoother reopening and limited signs of a second wave of infections.

Weakness in financials has been a continued issue across developed European economies. Prolonged periods of low rates, slow growth and the expectation of major defaults due to COVID-19 have hurt the outlook for banks in the region. The pan-European Stoxx 600 Banks Index touched a multi-decade low in Q3 and is down over 40% YTD. The European Central Bank's (ECB) banking supervisor Andrea Enria stated that Eurozone banks must brace for a rapid deterioration of their balance sheets as government support fades from the picture.

10-Year Real Yields (12 Month Average) - Europe



In spite of record-breaking fiscal spending and money creation, inflation seems a distant worry in Europe. In fact, eurozone core inflation for August came in at 0.2%, well below estimates of 0.4%. With inflation weakening, the odds of further expansion of the ECB's €1.35 trillion bond-purchase program have grown materially higher.

Q3 saw a further fall in rates across the Eurozone. German 10-year yields, already in negative territory in Q2, declined to -0.52%. Even riskier Italian 10-years ended the quarter near all-time low yields at 0.87%, down from 1.32% three months earlier. Of the major European economies, Italy is the only country with a positive real yield on its 10-year debt. The ECB's outsized role in the debt markets has kept a lid on borrowing costs for all Eurozone countries. It is quite possible that yields stay within a tight range as long as the ECB continues to provide support.

Americas

Canada's economy showed continued signs of recovery in Q3, after GDP sank at a record pace in Q2 due to the pandemic. The record annualized -38.6% drop came from a stricter lockdown regime. However, in August, the unemployment rate rebounded to a five-month low, with total employment 5.7% below its February level. Retail sales expanded in July and August, a fledgling sign of stronger private consumption. Other positive signs appeared in the housing market, with both sales and prices rising in August after slumping earlier in the year and housing starts jumped to a near-13-year high.

The Statistical Institute of Mexico cited the COVID-19 outbreak and the measures used to curb its spread as the main drivers of a nearly 19% drop in year-over-year GDP in Q2. The reading marked the steepest contraction on record and

Foreign Stock & Bond Indices - Total Returns

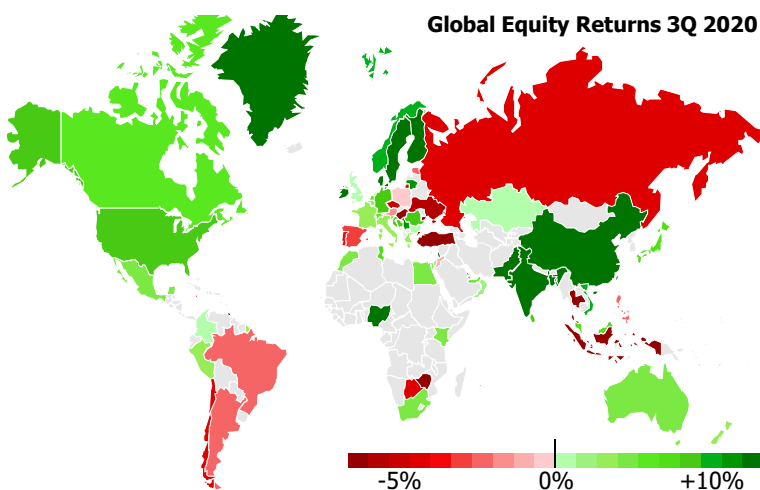
MSCI Broad Indices	3Q20	Barcap Global Indices*	3Q20
MSCI ACWI ex-US	6.25%	Global Aggregate	2.66%
EAFE (Developed)	4.80%	Pan-Euro	5.45%
Emerging Markets	9.56%	Asian-Pacific	2.60%
		Eurodollar	1.58%
		Euro-Yen	3.11%
		Other Currencies	3.26%
MSCI Regions			
Europe	4.51%		
Japan	6.94%	* <i>Unhedged</i>	
Pacific ex-Japan	1.98%		
Latin America	-1.28%		

the fifth consecutive quarter of negative growth. At its September meeting, the Governing Board of the Bank of Mexico trimmed the overnight interest rate by 0.25% to 4.25% to help spur growth, its eleventh consecutive cut and the lowest rate since 2016. There are concerns that Mexico is nearing the end of its accommodative rate cycle due to rising inflation. According to deputy central bank Governor Javier Guzman, "The probability that we'll have to take a pause has increased." He went on to say, "that room for cuts has probably grown much more limited due to inflation and the possibility that Mexico keeps raising the minimum wage next year." During Q3, consumer prices and inflation both rose. Inflation is predicted to end 2020 at 3.3% and rise to 3.4% in 2021.

In Latin America, regional inflation edged up to 6.2% in August driven by price pressures in Brazil and Mexico. Central banks in Columbia and Mexico cut policy rates while Chile, Paraguay and Peru kept their rates unchanged.

Asia

China has become the first major economy to return to growth since the coronavirus started sweeping across the world earlier this year. Its economy grew 3.2% in Q2, representing a 11.5% rebound from Q1. Economic recovery accelerated further in Q3. Retail sales, the last holdout among the economy's major components, returned to pre-coronavirus levels in August, showing its first month of growth this year.



Manufacturing PMI rose from 50.9 in June to 51.5 in September, remaining in expansionary territory for a seventh straight month. Nonmanufacturing PMI increased to 55.9, compared with 54.4 in June, mainly driven by the services sector. This alleviated concerns about a two-track recovery in China, where factories rebounded to pre-virus levels relatively quickly, but in which services continued to languish amid lingering fears around the contagion.

Retail sales were up 0.5% in August from a year earlier, benefiting from the lifting of lockdowns across the country, a strong improvement from June's drop of 1.8%. Though consumption has rebounded, headwinds remain in China. The unemployment rate is at 5.6%, compared with 5.3% in January when the COVID-19 began to affect hiring.

The economic rebound has been supported by recovering global demand for Chinese-made goods. In August, outbound shipments from China rose 9.5% from a year earlier, marking the third consecutive month of YoY increases. Key to the export recovery has been China's outbound shipments of coronavirus-related medical supplies. Electronic goods have also fared well as swaths of the developed world shifted to online work. Imports, meantime, fell 2.1% from a year earlier. Even though China has stepped up purchases of commodities in global markets, the pace and the value of purchases have fallen due to the plunge in commodity prices after the coronavirus pandemic.

Although China has refrained from turning to huge stimulus measures, the central bank has modestly eased its lending rates, injecting more liquidity into the market. Meanwhile, the government turned to infrastructure projects to boost the economy in the first half of the year. For their part, the Chinese people have looked to stocks over other sources of income during COVID-19 uncertainty. The CSI 300 index reached its highest level for 2020, 10.5% for the year. Low interest rates have also fueled appetite for stocks.

In mid-September, Yoshihide Suga replaced Shinzo Abe as prime minister of Japan. While it remains largely unknown what stamp Suga will place on the economy following "Abenomics," it is believed he will seek stability in the near term. Economic activity is expected to contract sharply for the year on shrinking private consumption, and analysts believe Suga will focus more on structural reform, the third arrow of Abenomics, rather than on monetary and fiscal spending.

The current significant fiscal and monetary stimulus is expected to help spur a recovery in Japan in 2021. However, concern remains amid a recent rise of COVID-19 cases, tempering any optimism. Data indicates a softening decline as July's industrial output fell at a slower pace than in Q2 while retail sales expanded, perhaps hinting at a possible rebound in economic activity for Q3. As expected, the BoJ made no change to its monetary policy stance at its September meeting. Short-term rates remained unchanged at -0.10% and the Bank continued to refrain from setting an upper limit on the amount of JGBs it will purchase to cap the 10-year JGB yield at 0.00%.

Focus On: The Complex World of Transaction Costs

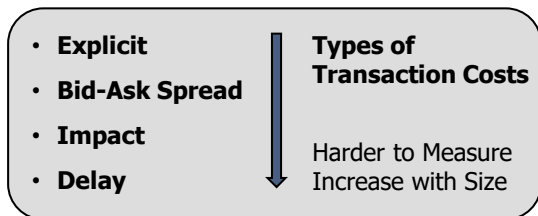
To say that fiduciaries are focused on expenses would be an understatement. Performance is a fickle thing, ebbing and flowing with market conditions, but the constancy of fees lends itself to monitoring and management like no other aspect of investing. Hence the expense ratio figures prominently in manager searches and performance monitoring.

However, the expense ratio excludes a category of real-world investment costs. Transaction costs generated by the purchase or sale of securities in the portfolio can have a big impact on returns, in some cases a much greater impact than management fees. Unlike fees and expenses included in the expense ratio, transaction costs can be very difficult to quantify, and vary tremendously depending on market conditions.

Explicit and Implicit Transaction Costs

Imagine you place the world's dumbest pair trade – buy 100 shares of Apple; sell 100 shares of Apple – and that the two orders are executed at exactly the same moment in time, on exactly the same exchange. What results do you expect?

It's tempting to say you expect a break-even trade, less the commission charged by the broker. If the broker charges a commission of \$2 per trade, you would expect to end up with a loss of \$4 due to transaction costs. In reality, you would lose more than \$4. The price on the buy order will be a bit higher than the price on the sell order. If your buy order executes at \$115.01 and your sell order at \$114.99, you would lose another \$0.02 per share, bringing your loss to \$6.



You were not cheated, the additional \$2 of cost pays for something important. Explicit costs such as commissions pay for the infrastructure of investing – the complex of people, systems, processes, and regulators that handle your orders and connect buyers with sellers. The implicit cost of \$2 is the price of liquidity – the ability to quickly find a willing party to match your purchase with a sale (or sale with a purchase) at a price that is close to the quoted market price.

In our small transaction of a widely-traded stock, explicit costs outweigh implicit costs 2 to 1. For institutional investors, the relationship is almost always reversed. Infrastructure costs are mostly fixed, and scale down with transaction size – to nearly zero for large investors. However, liquidity cost does not scale down with size. For smaller transactions it is stable, but for larger transactions the cost of liquidity can soar.

Immediate Liquidity and the Bid-Ask Spread

The first measurement of liquidity cost is the bid-ask spread, the \$0.02 of price difference for the Apple noted above. More formally, it is the difference between what the most willing buyer will pay and the most willing seller will accept for a unit of securities in a market. The 2 prices are referred to as the bid price and ask price.

The ask price is higher than the bid price; transactions will occur until this relationship is satisfied. Imagine someone makes a market for Apple stock with a stack of buy and sell orders centered around \$115 per share, with a bid of \$114.99 and an ask of \$115.01 (as illustrated). If a new buyer places an order to purchase 100 shares "at the market", that order would immediately be filled at the ask price. Similarly, a sell order for 100 shares would immediately be filled at the bid price.

Orders continue to be processed until the most willing buyers or sellers in the market are exhausted. Once that happens, the price of the stock changes. For example, if buy orders pour in, all willing sellers at \$115.01 will eventually be fulfilled, and the ask price will increase to the next level – in other words, the price of the stock will rise. Buying at the ask price, or selling at the bid price, is called "crossing the spread."

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The width of the spread depends on the number of ready buyers and sellers for that specific security. Securities that are heavily traded, such as Apple, have large order stacks and narrow bid-ask spreads. Securities that are not frequently traded can have much wider spreads. Generally, largecap stocks are more thickly traded than smallcaps, and stocks are more thickly traded than bonds.

The size of a market and willingness of participants to transact is also closely related to volatility. Under stress, the bid-ask spread tends to widen; during extreme stress, such as occurred in March and April of 2020 due to COVID-19, spread widening can be considerable. Transaction costs increase when investment flows into or out of a particular asset class accelerate and become one-sided – if everyone wants to sell and no one wants to buy, an unfortunate investor that feels compelled to sell can expect to pay a significant premium for liquidity.

Simple AAPL Market Order Stack

	Buy 475,000 @ \$114.97
	Buy 350,000 @ \$114.98
	Buy 250,000 @ \$114.99
Bid: \$114.99	
Ask: \$115.01	
Mid: \$115.00	Sell 250,000 @ \$115.01
Spread = \$0.02	Sell 175,000 @ \$115.02
	Sell 300,000 @ \$115.03

Events affecting particular securities can be a major factor. Prior to COVID-19 you could expect to pay 1 basis point or less to cross the spread for Apple, and about 3 bp for Carnival Cruise Lines. In late March costs spiked to nearly 20 bp. After the initial shock, both stocks experienced more extreme daily movement. However, costs for CCL remained elevated, due to the adverse impact of COVID on the cruise line industry.

For very small stocks, the cost of liquidity can be much higher. Consider Oncternal Therapeutics, one of the smallest companies in the Russell 2000 Index. Pre-COVID, it was not unusual to pay 100 basis points or more for immediate liquidity; but post-COVID, spreads exceeded 500 basis points on numerous days. An investor would need to be very sure of their trade before crossing that spread!

Generally, bonds trade more thinly than stocks, because fixed income markets are less efficient. During March of 2020, US investment-grade spreads were trading 4-5 times wider than normal, and even US Treasuries were 2-3x wide.

Bigger is Not Always Better

For large trades, the issue becomes thornier. In the order stack illustrated, a large investment manager that wanted to immediately sell 1,000,000 shares of Apple has a problem. The first 250,000 shares would go at the current bid price. But in order to sell the next 350,000 shares, the investor would have to accept the next lower price, and so on.

This is an example of impact cost for large trades. Put simply, if a trade is large enough, that trade itself causes the market price to move by exhausting all immediately available liquidity. For thickly-traded largecaps, a trade would have to be very big indeed for impact cost to become an issue; but it can easily be a problem for those trading smaller-cap stocks and, generally, bonds.

How can an investor control impact cost? The primary way is to break up the order and allow it to execute more slowly, over hours or even days. That can be done within a single market, or the order can be processed through multiple markets, including alternative exchanges and dealer-run "dark pools." The bet is that, over time, additional buyers or sellers will enter the market and provide enough additional liquidity to execute the trade. This comes at the cost of added complexity and, for some markets, reduced transparency.

Delayed execution gives rise to another problem – the market itself is constantly moving. If a sell order is delayed over several days and the market declines, the value received will be less. This is an example of delay cost, which is price difference due to market movement as an order is executed. Delay can have a positive or negative effect, but the expected outcome is negative; investors tend not to sell when they expect prices to rise, or buy when they expect prices to fall.

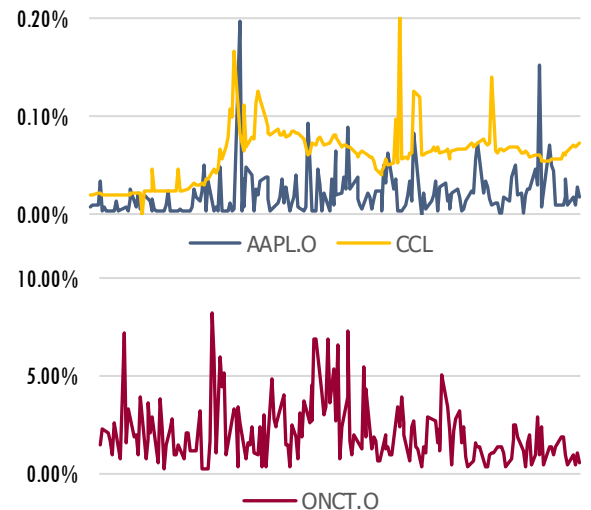
Since trade size matters, fund size also matters. As a rule, transaction costs start out higher and gradually decline as the portfolio gets bigger – to a point. Eventually, impact and delay costs overwhelm explicit costs, and transaction costs start to increase. Particularly for less liquid markets, this places a practical upper limit on the size of a fund. Once a fund reaches the point where transaction costs accelerate, managers will typically close the fund to new investors.

Impact and delay costs are difficult to measure for a portfolio over time, as they are influenced by each transaction. The most cited research on the subject comes from Roger Edelen, Richard Evans, and Gregory Kadlec. Their modeled transaction costs per unit for US largecap core equity funds averaged 13 basis points for commissions, 7 bp for bid-ask spreads, and 23 bp for impact and delay. For smallcap core funds, unit costs averaged 17 bp for commissions, 28 for spreads, and 104 for impact and delay. Factoring in turnover, fund transaction costs averaged 61 bp for largecap and 232 bp for smallcap core. These figures likely overstate reality, since the mean is affected by the skewed nature of portfolio turnover.

The turnover ratio of a mutual fund measures the lesser of purchases or sales (excluding all securities with maturities of less than one year) divided by average monthly net assets. While most actively-managed largecap funds turn less than 50% of their portfolio per year, high-turnover managers can turn over 200-400% per year. (One fund in our sample had turnover of over 800%.) A rough adjustment for skew suggests that approximately 35bp and 109bp are more representative for largecap and smallcap transaction costs, respectively. Still, these cost levels are significantly higher than those for index funds, which barely experience measurable tracking error.

Selected Bid-Ask Spreads for US Stocks

% of Midpoint at Close, 1/1/2020 - 9/24/2020



Why are index funds more efficient? They simply trade less. Transactions for equity mutual funds are typically generated by investor cashflows, which are usually small compared to the size of the fund. For stock funds, specific security trades are rare, most often due to corporate actions or reconstitution of the index. Reconstitution transactions are even more rare for broader indices such as the Russell 3000 or S&P 1500 compared to the classic S&P 500, since stocks do not enter or exit the index due to changes in size. Bond index funds transact more often, due to changes in ratings and new issuance.

An active manager would point out that they trade for a reason, and the cost of holding on to a bad security, failing to buy a good one, or sitting in cash can far outweigh transaction costs. Fair enough. We simply note that, in addition to the headwinds imposed by market efficiency and higher management fees, active managers must also make up a transaction cost gap in order to outperform. That is particularly true for high-turnover strategies – while uncommon, equity strategies with annual turnover greater than 100% are not rare.

Forced Transactions

Transactions costs are particularly important to consider for investors that are in forced trading situations. Portfolio rebalancing for multi-asset portfolios, including endowments, pension funds, balanced funds, and target-date funds can generate forced transactions. If allocation guidelines are strict rules, the manager must buy or sell whenever asset class exposures exceed certain limits. Unfortunately, the probability of exceeding an exposure limit, and the magnitude of corrective trades, both increase with market volatility. As we've seen, transaction costs also increase with volatility. When markets are selling off, strict rebalancing rules can cause investors to execute larger transactions than normal at the worst possible time. The impact of this was material for some balanced and target-date fund investors in Q1 2020.

Forced transactions also occur due to external cashflows. When fund investors pile into less risky bond funds and bail out of riskier equity funds during market corrections, both types of funds can incur elevated costs. 401(k) and other defined contribution plan participants tend not to make such dramatic allocation shifts, at least not quickly, but retail investors do.

Finally, decisions to change funds, spin-off or terminate retirement plans, or make large spending outlays for endowments can generate big tickets. Investors may consider postponing such events, if possible, during periods of extreme volatility.

Managing Transaction Costs

Professional traders have access to an array of sophisticated techniques in order to optimize costs, including trade netting, flow data analysis, dark pools, and private trading venues. They can also evaluate trade-offs, such as accepting higher explicit costs to transfer some or all of the implicit cost risk to a dealer. Some of these techniques reduce transparency, and can give rise to conflicts of interest. Depending on the strategy in question, the quality of the trade floor and the manager's compliance/ethics policies can be just as important as the talent of the investment management team.

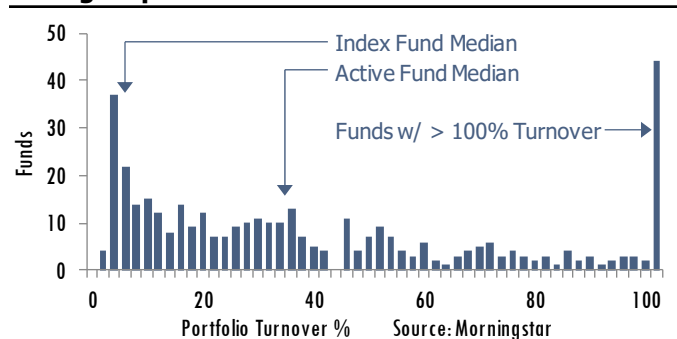
Unlike management fees, transaction costs are difficult to quantify and not subject to negotiation. What can fiduciaries do to manage the impact? Here are a few tips:

- Track fund performance, and ask managers whether transaction costs contributed to any underperformance.
- Ensure that contracts require managers to seek best execution for trades, as opposed to directing trades to a specific broker-dealer or market.
- Consider transaction costs in evaluating new strategies, especially funds with high turnover or leverage.
- Reconsider tight, rule-driven rebalancing policies to allow for more discretion.
- Time and manage large transitions carefully, hiring a specialist transition manager as needed.

Turnover in Core US Mutual Fund Strategies

Turnover Ratio	Largecap Stocks	Smallcap Stocks	Core Bonds
Median - Index Funds	5%	18%	77%
Median - Active Funds	36%	52%	92%
Maximum	838%	454%	1434%

Largecap Core Stock Fund Turnover Distribution



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