Cash to Card Transition and Super-Apps set to transform the Global Digital Payments Industry:

A deep dive into the Nasdaq CTA Global Digital Payments Index™ (WALLET™)

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Global cashless payment volumes will nearly double from current levels to 1.9 trillion transactions by 2025, according to analysis by PwC and Strategy&. The report forecasts transactions in excess of 3 trillion by 2030, led by growth in Asia and Africa. Three trends comprise the foundation of innovation in the digital payment ecosystem: the proliferation of "super-apps," the strong cultural underpinnings of cashless transactions, and the evolution of digital payment business models and infrastructure.

As a nonprofit trade association and producer of CES©, the Consumer Technology Association (CTA)® enjoys a unique perspective to innovation in cybersecurity, artificial intelligence, digital payment tools and more. We monitor advancements in the global digital payment ecosystem for the Nasdaq CTA Global Digital Payments Index™ (WALLET™) to identify the companies, products and trends with the greatest impact on digital payments in the coming years.

The Proliferation of Super-Apps

Accenture Research defines super-apps as umbrella apps that offer a comprehensive set of services for users' everyday lifestyle needs, using one integrated interface or platform. These super-apps demonstrate the convergence of multiple technologies to create an unbroken experience for the user.

Alipay and WeChat are two super-apps that dominate the hyper growth in the Asian market. Innovative solutions offered by these apps include the Alipay "tour pass," or temporary services, for those traveling to China. Such services show the reach and practicality of digital payment services – they are not bound by international borders and can build temporary use into their model.

Strong Cultural Underpinnings of Cashless Transactions

The strength of the cashless transaction sector is illustrated by forecasts projecting the industry to dramatically increase. PwC, for example, anticipates a 42% boost on global volume through 2025.

This growth is not just consumer centric. Digital payments on an industrial level offer operational resilience and business continuity for enterprise use. Two companies that address this very issue are Fiserv and Toast. Fiserv offers enterprise solutions for banking, global commerce, merchant acquiring, billing and payments, and point-of-sale solutions. Toast is a point-of-sale and management system for restaurants.

Emerging markets recognize this value. Especially in markets that don't rely on large financial institutions, you see the proliferation of a financial culture reliant on digital payment technologies. A prime example of a digital payment company responding to a cultural financial need is dLocal, a digital payment platform founded in Uruguay and designed to answer local payment challenges in emerging markets. Its payment coverage includes high-growth, emerging economies in Latin America, the Asia Pacific region, the Middle East and North Africa.

Digital-wallet-based transactions grew globally by 7% in 2020, according to FIS, a financial services technology group. FIS predicts that digital wallets will account for more than half of all e-commerce payments worldwide by 2024 as consumers shift from card-based to QR code-based transactions. The digital payment industry is answering this call for growth through agile and context-specific solutions.

Digital Payment Business Models

Right out of the gate, the digital payment industry has provided innovative solutions to the financial challenges in global markets. The space is undergoing a change from a business model focused on siloed payments infrastructure to a consumer-centric approach. It is a move that delivers valuable products and services to users while reducing costs, overhead and fraud risk.

Companies approach this shift toward a consumer-centric experience in two primary ways: buy now, pay later (BNPL) and cryptocurrency. PayPal and Zip Co are prime examples of success in the BNPL arena. For cryptocurrency, players like Coinbase are leading the pack. Companies like these show the power of agility and a relentlessly user-centric attitude that directly responds to the pressures of a shifting business model.

Methodology

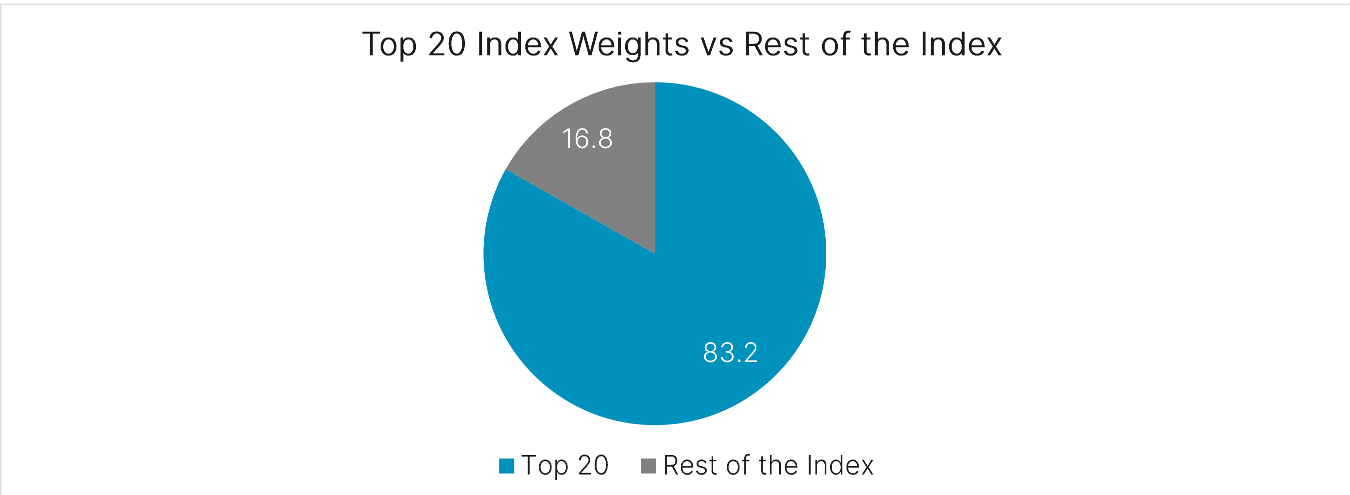
The Nasdaq CTA Global Digital Payments Index™ (WALLET™) was launched on November 15, 2021 at a base value of 1,000, and is designed to track the performance of companies engaged in the global digital payments industry. It is rebalanced quarterly in March, June, September and December and is reconstituted semi-annually. All securities must have a minimum market cap of at least $500 million (USD) and an average daily dollar trading volume of at least $1 million (USD). Additionally, at least 20% of a security's total shares outstanding must be publicly available for trading.

The index is a modified free float market capitalization-weighted index. A theme-weighted free float market value is calculated for each Index Security as the theme-adjusted market capitalization multiplied by its free float. Weights are determined by first dividing each Index Security's theme-adjusted free float market value by the aggregate theme-adjusted free float market value of all Index Securities.

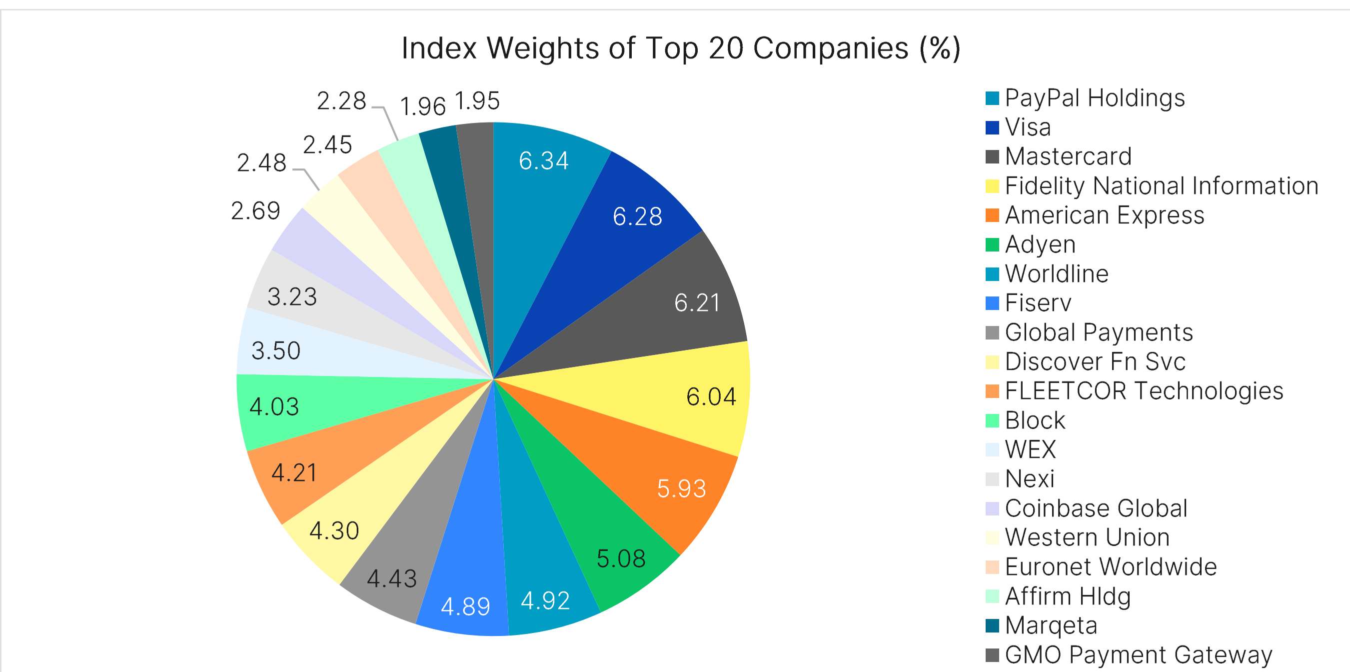
Each index constituent must be classified by CTA as a mobile payments company, and may fall into one of four categories identified by CTA based on the type of product or service provided. These classifications speak to the differences in business models within the digital payments industry.

The index selection process is refined to include those securities that are actively engaged in the digital payments industry. This is quantified by way of a metric, a theme intensity score determined by CTA, which is assigned to each company in the index, based on the perceived degree of involvement within the digital payments space. The theme intensity score ranges from 0 to 1. Only securities with a theme intensity score equal to or exceeding 0.5 are eligible for inclusion and are classified as Tier 1 Securities. As of the Reconstitution Reference date, securities that are Tier 1 Securities may remain in the index provided the theme intensity score remains at least 0.45. This classification ensures that companies are strongly aligned with the overall digital payments theme. The index selection process is further refined to ensure alignment with the overall theme. A maximum number of 50 securities are selected based on set criteria: 1) the top 45 securities with the highest theme intensity score are automatically selected 2) securities in the index as of the Reconstitution Reference date that are within the top 55 and have not been selected in Step 1 are added in rank order until the target of 50 is reached 3) should the count of 50 not be reached, securities ranked from 46th-55th not in the index as of the Reconstitution Reference date (i.e. those securities with theme intensity scores below 0.5) are added to the index until the count of 50 is reached. Should the number of Tier 1 securities not exceed 30, securities with a theme intensity score equal to or exceeding 0.25 and up to 0.5 ("Tier 2 securities") are added till the count of 30 is reached. These securities are ordered in order of theme adjusted market capitalization. Additionally, weights of the index constituents must meet the following criteria: 1) no single security weight may exceed 6% 2) five index security weights may exceed 4.5% 3) a security cannot be included if its index weight is below 0.3% 4) no weight of a tier 2 security may exceed 2%.

Index Composition and Performance



Source: Nasdaq Global Indexes, FactSet as of July 29, 2022

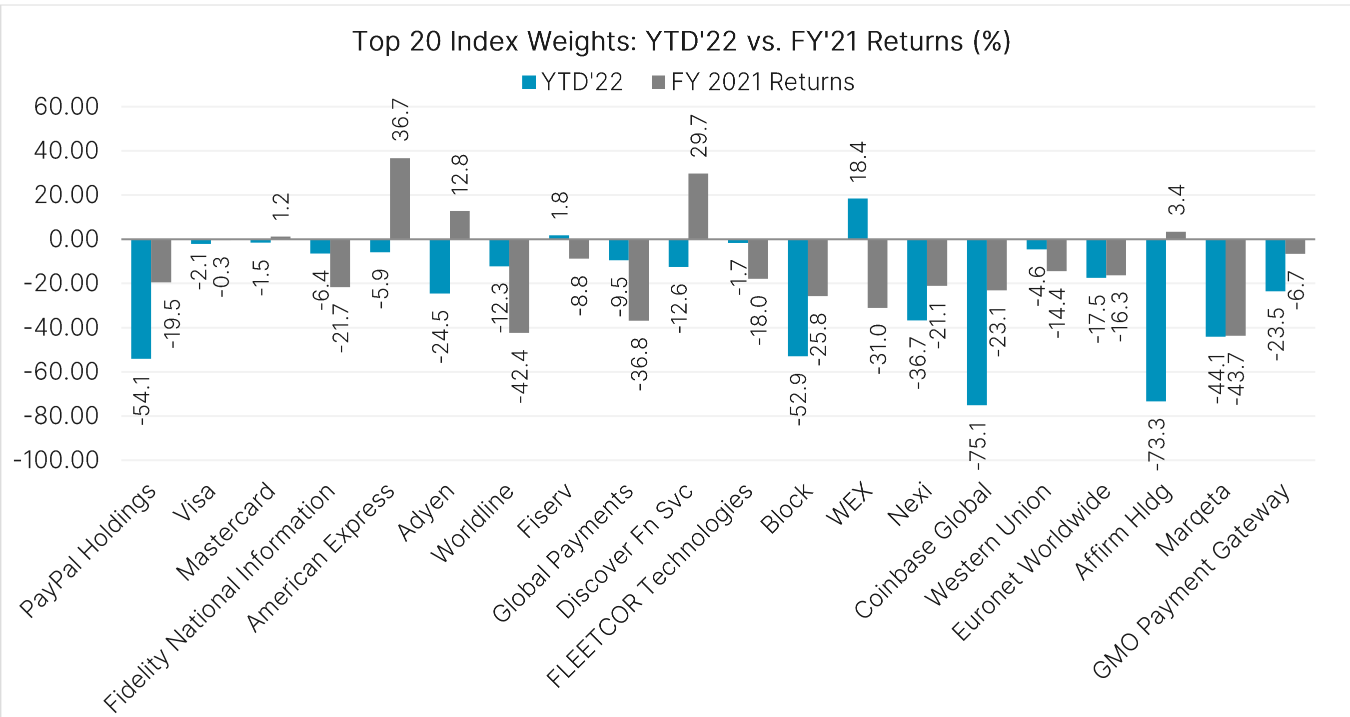


Source: Nasdaq Global Indexes, FactSet as of July 29, 2022

The Nasdaq CTA Digital Payments Index (Wallet) is down 25.3% YTD (July 29, 2022), underperforming the Nasdaq-100 ® Index which is down 20.7% YTD and S&P 500 which is down 13.3% YTD. Since the launch of the index (November 15, 2021), the Wallet Index has been down 33.5%, underperforming the S&P 500 (down 11.8%) and the Nasdaq-100 Index (down 20%). Since the beginning of its backtest period (March 9, 2018), the Wallet Index has been up 19.3%, underperforming the S&P 500 (up 48.2%) and the Nasdaq-100 (up 82.3%).

Of the 40 constituents in the Nasdaq CTA Global Digital Payments Index as of July 29, 2022, the top 20 constituents comprise about 83% of the index weight, with leading incumbents PayPal Holdings, Visa, Mastercard, Fidelity National Information Services and American Express comprising the top 5 names. The top 20 companies also include Block (f/k/a Square), Discover, Affirm, Western Union, and Coinbase Global, illustrating the wide range of players from credit card issuers to payment processors, Buy Now, Pay Later (BNPL) companies and cryptocurrency platforms. The rest of the index's 20 constituents make up about 17% of the remaining weight.

Index performance of top 20 constituents



Source: Nasdaq Global Indexes, FactSet as of July 29, 2022. For Coinbase, Affirm and Marqeta, FY'21 returns reflect post IPO returns

Stronger consumer spending, more favorable macroeconomic environment benefitted select constituents in FY'21; macroeconomic concerns have weighed on most of the index in 2022

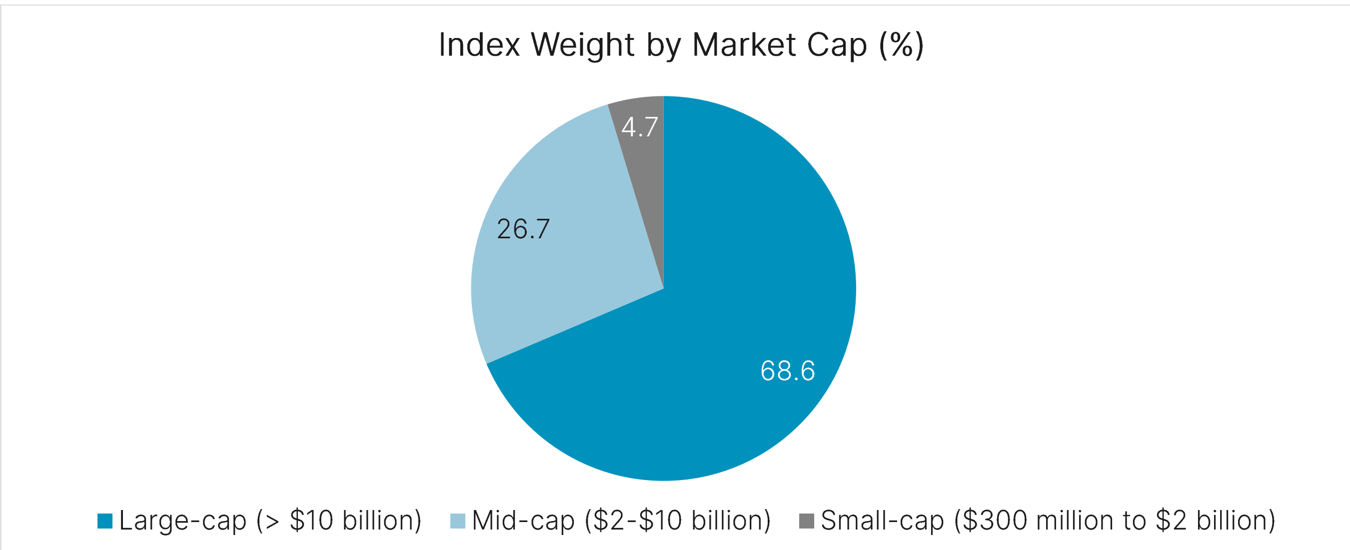
The top 20 companies of the Nasdaq CTA Global Digital Payments Index have marginally outperformed the overall index YTD, and significantly outperformed the index since the beginning of its backtest period (March 9, 2018) as well as since the index value peaked (February 16, 2021).

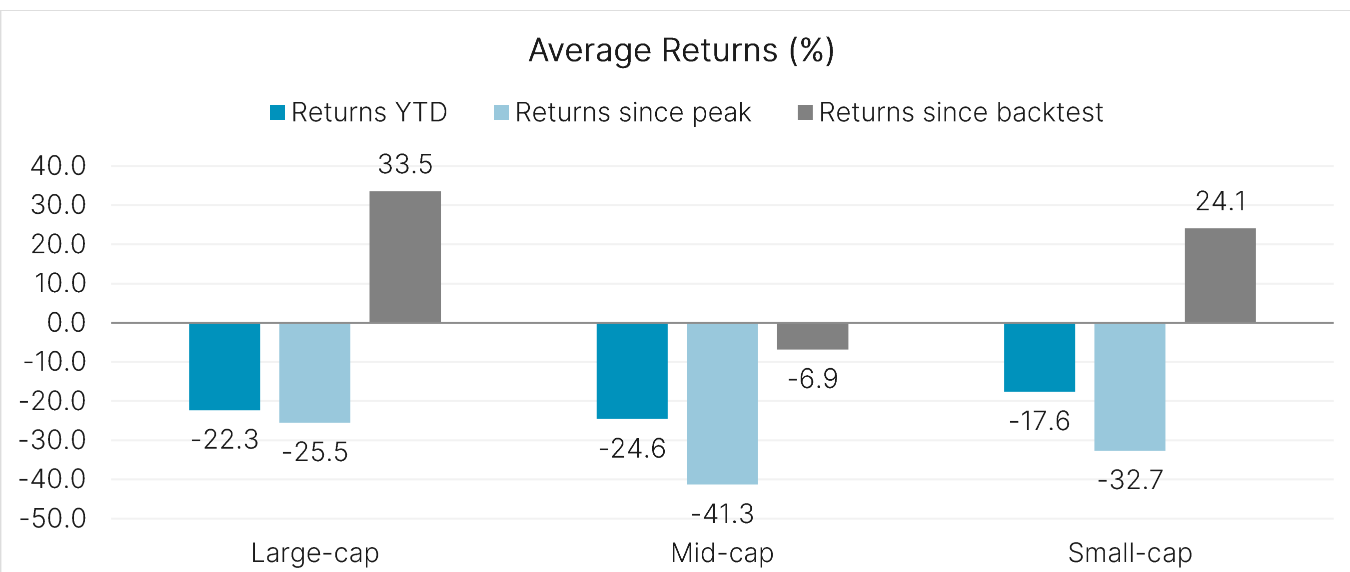
In FY'21, some companies benefitted from a stronger US consumer wallet and a more favorable macroeconomic environment. Constituents such as American Express, Discover Financial Services, and Adyen posted strong double-digit returns while Mastercard and Affirm posted low single-digit returns. All other constituents in the top 20 posted declines with reported financial results often falling short of analyst expectations.

If we look deeper into the top 20 names, we see that performance has diverged. American Express was the strongest outperformer, up about 37% in 2021 driven by strong results throughout the year, one of the best in the company's history. Earnings surprised to the upside to the tune of 22%-27% for the last two quarters of 2021, acting as a tailwind for the stock. On the other hand, Marqeta's stock declined considerably, down 44% following its IPO in June 2021. After reporting a wider than expected loss in its first quarter as a public company due to elevated employee-related costs, the company's stock declined.

In 2022, macroeconomic concerns have weighed more heavily on stocks than fundamentals. Companies with exposure to niche segments such as travel that were characterized by higher fuel prices were able to post strong results. For example, WEX recorded its most profitable quarter in history in Q12022 due to recovery in travel volumes. The stock is up 18% YTD. This suggests that digital payment companies with exposure to certain niche segments can outperform even in tough macroeconomic conditions.

Index weight and performance by market-cap

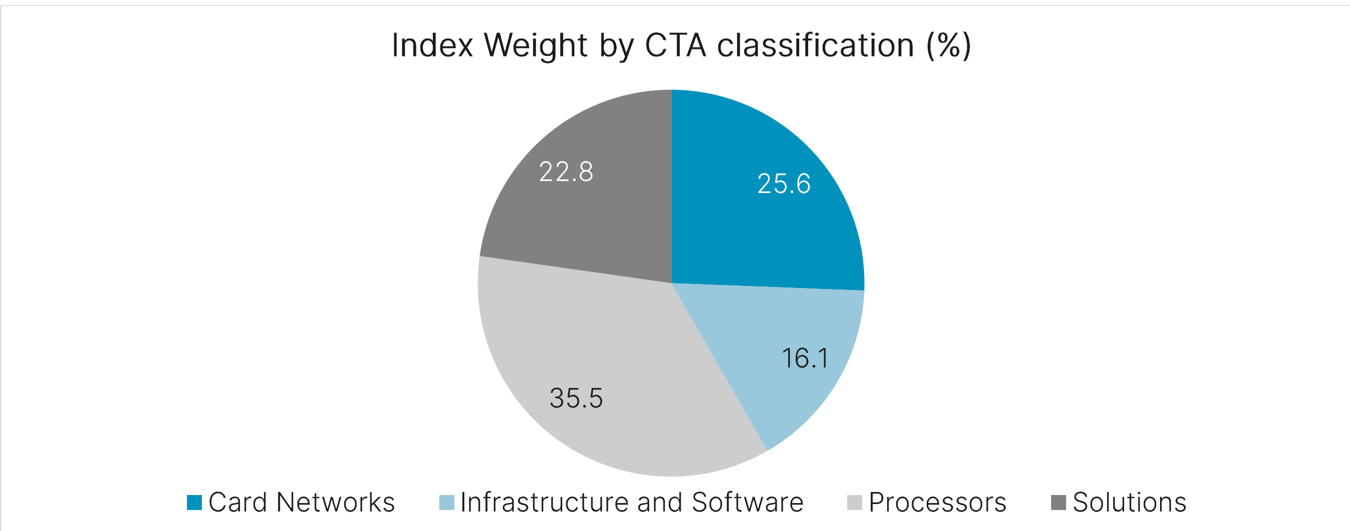


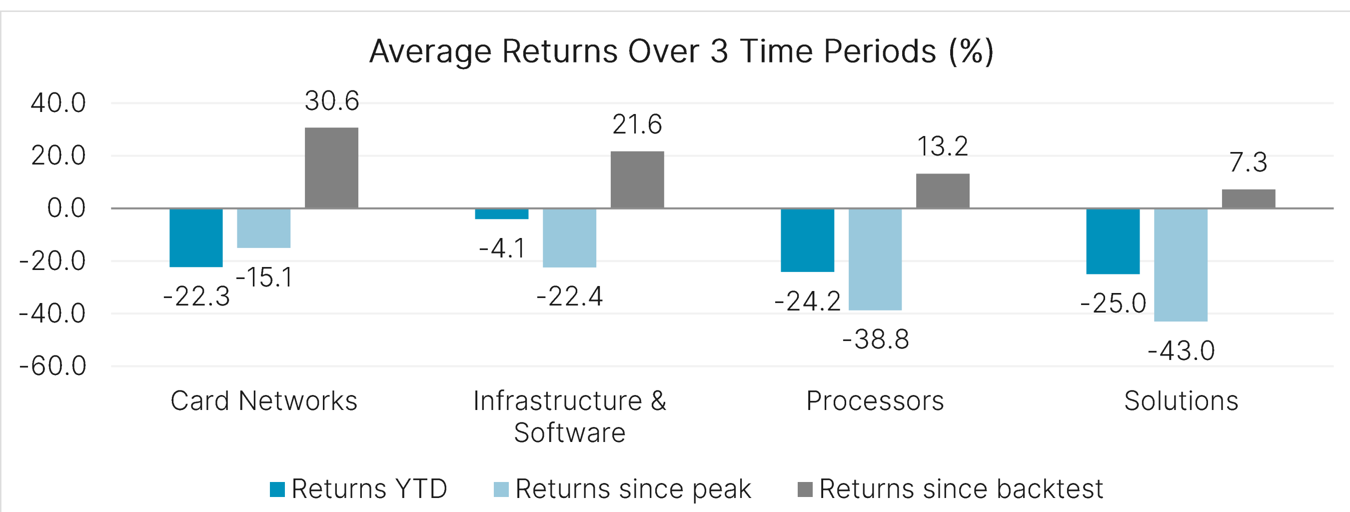


The Nasdaq CTA Global Digital Payments Index has a large-cap tilt with about 69% of the index weight contributed by companies with a market cap above $10 billion. More than one fourth of the index weight comes from securities with a market cap between $2-$10 billion, and only about 5% of the index weight comes from companies with a market cap below $2 billion. Consumers expect inflation to persist for the rest of the year and into 2023. According to a Survey of Consumer Expectations released by The Federal Reserve Bank of New York's Center for Microeconomic Data in July 2022, median one-year inflation expectations came in at 6.2%. In such an environment, an index that favors large-caps is likely to perform better than one that favors small-caps, based on available historical data.

When we look at average returns of the index constituents over three time periods, we see that large-cap has outperformed both mid-cap and small-cap for the entire period since the beginning of the backtest, and since the index peak in early 2021. For the YTD period, small-cap has outperformed both mid-cap and large-cap on a relative basis. The leading incumbents of the digital payments industry have generally been able to better weather the challenges in the post-pandemic period, benefitting from a return to travel and in-store shopping, as well as easier year-over-year comparisons than some of the younger players in the space that experienced exceptional growth during the initial phase of the pandemic.

Index weight and performance by CTA classification



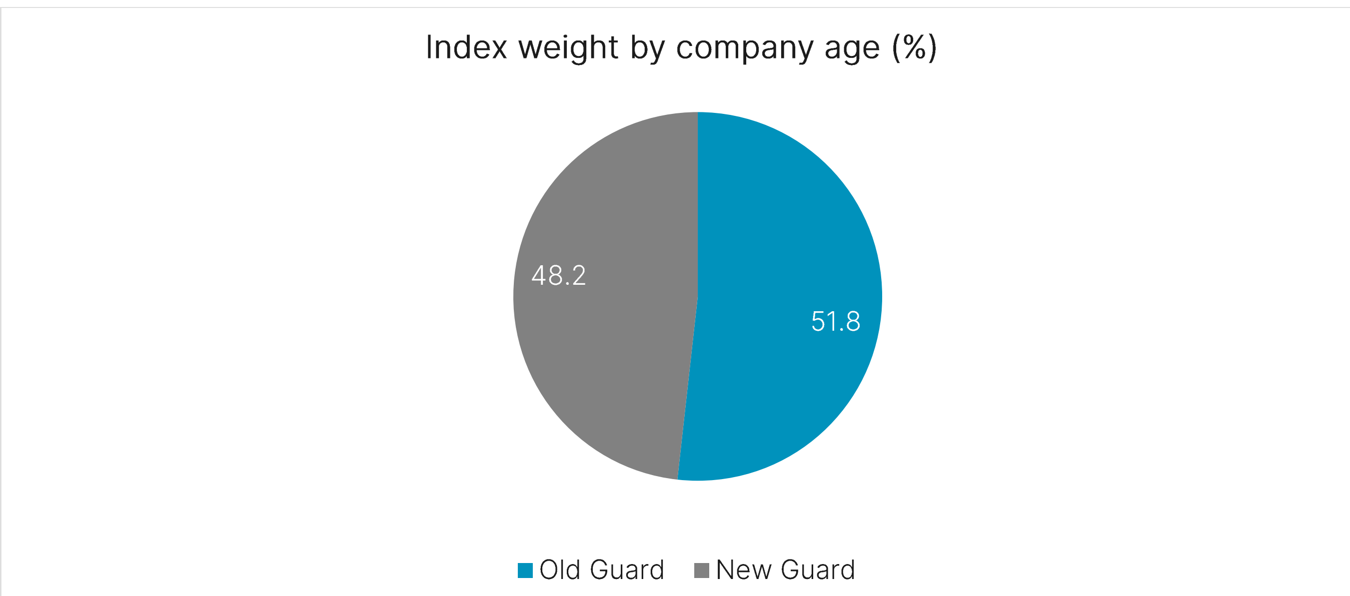


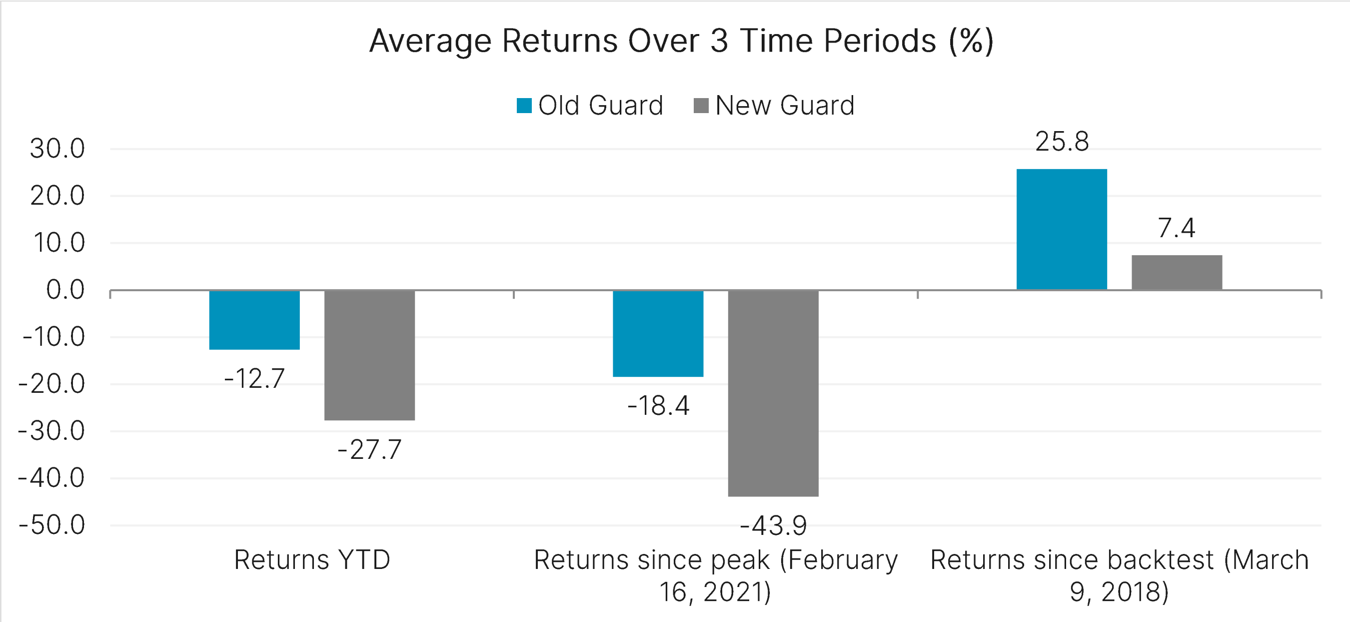
The performance and composition of the Nasdaq CTA Global Digital Payments Index can be further analyzed across four main categories, as identified by CTA: Card Networks, Infrastructure & Software, Processors, and Solutions.

The largest category is Processors, with 17 constituents comprising about 36% of the index weight. Companies such as PayPal Holdings, Adyen, Block, WEX and Nexi are among the top five names of this segment. Card Networks is the next largest by weight with seven constituents, and largely consists of leading incumbents such as Visa, Mastercard, Discover, and American Express, which collectively represent nearly 23% of index weight. Solutions (approximately 23% of the index weight) consists of 10 companies such as Worldline (a European leader in the payments and transactional services industry and number four player worldwide), Fiserv (a leading global provider of payments and financial services technology solutions) and FLEETCOR Technologies (a leading global provider of digital payment solutions that counts oil giants as its major customers). Infrastructure & Software is the smallest segment with six companies comprising 16% of the index weight, of which Fidelity National Information Services (a leading provider of technology solutions for merchants, banks and capital markets) is the largest. The well-diversified nature of the business models within the index is likely to be a source of stability as certain areas of the digital payments industry continue to expand and evolve.

If we examine the average returns over the three time periods, we see that Card Networks stood out as a relative outperformer for both the entire period since beginning of the backtest, and since the index peak. For the YTD period, Infrastructure & Software emerged as the relative outperformer.

Index weight and performance by Company Age (%)





The WALLET Index consists of companies that make up both the Old Guard and New Guard of digital payments companies. This distinction serves to illustrate the evolving nature of digital payments companies, with newer companies seeking to expand into areas such as cryptocurrency and Buy Now, Pay Later.

Companies that comprise the Old Guard (about 52% of the index) went public before 2009 – a delineation that was chosen based on the observed acceleration of financial technology startups post-2008 Financial Crisis. During this period of crisis for traditional finance companies, the whitepaper underlying the launch of Bitcoin was published by Satoshi in October 2008, ushering in the age of cryptocurrency. Notably, Visa's IPO took place in March 2008, and was the largest IPO in U.S. history at the time. The next IPOs within the index were Cielo and Zip in the second half of 2009, both considerably smaller and outside the U.S.

Card Networks and Infrastructure & Software companies comprise nearly two-thirds of the Old Guard while Processors and Solutions comprise nearly 90% of the New Guard. The New Guard (about 48% of the index) includes companies that went public in 2009 or later. Some of the most recent entrants that make up the New Guard include Coinbase, Marqeta, Affirm, Toast, Wise, and DLocal, all of which went public in 2021. The entry of new competitors in the digital payments space suggests that market participants see opportunity to capture value in a growing market.

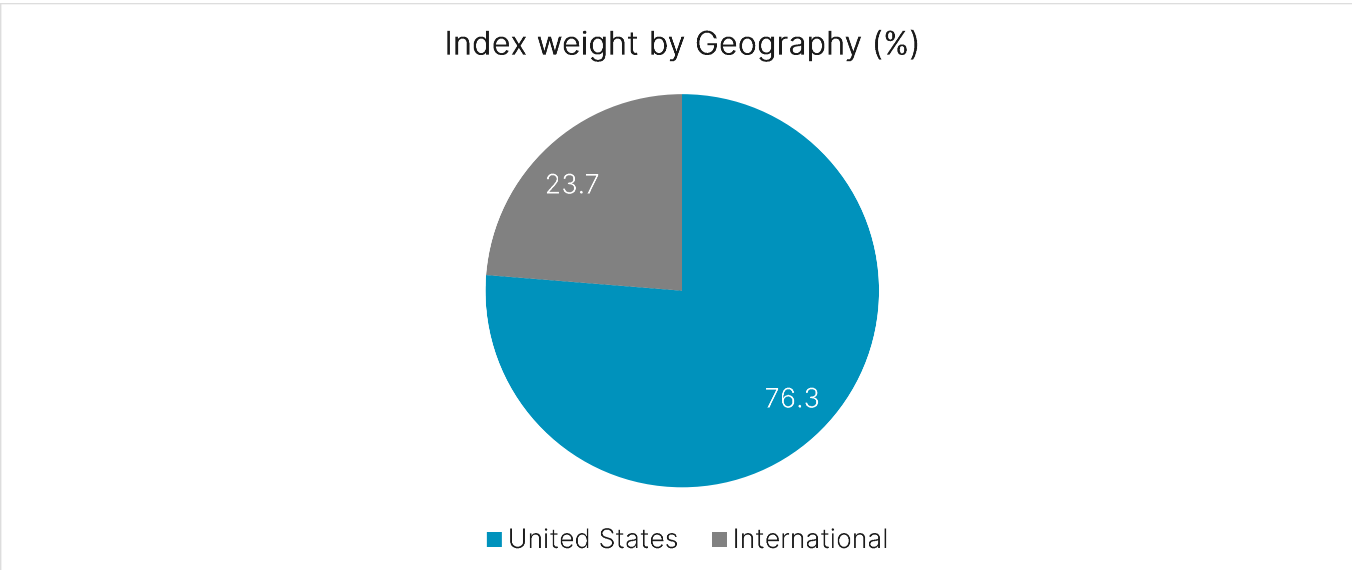
If we examine the average returns across three time periods, we see that the Old Guard has outperformed the New Guard, suggesting relative resilience of tried-and-tested business models during a volatile market environment.

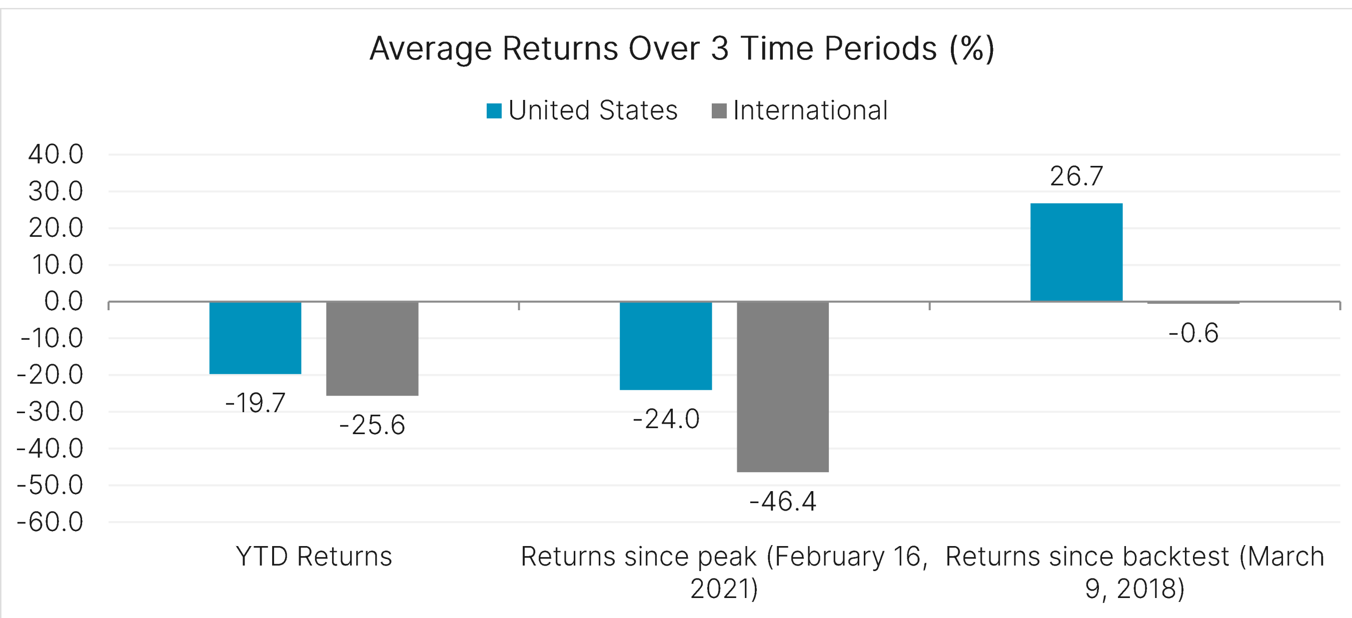
Companies that make up the Old Guard have been better positioned to capture value and outperform pre-pandemic and post-pandemic, while the New Guard has been primarily dragged down by companies with exposure to cryptocurrency and Buy Now, Pay Later themes. The volatile nature of cryptocurrency and its sensitivity to broader macroeconomic trends has led to a dramatic decline in overall market capitalization throughout 2022, dropping to less than $1 trillion from its November 2021 peak of $3 trillion[1]. With regards to BNPL, there have been multiple headwinds characterizing the industry in 2021-2022, with demand for services

[1] https://www.cnbc.com/2022/06/15/bitcoin-has-lost-more-than-50percent-of-its-value-this-year-what-to-know.html

less than anticipated, uncertainties in the regulatory environment, and concerns surrounding younger users getting into debt. While user growth has been remarkable, it has not always translated into growing profits. This, in turn, has weighed on the stock performance of companies exposed to this trend. One of the largest players in the space – Affirm – has seen its price fall by 77.5% since the index peaked in February 2021, despite YoY revenue growth of 39% in the most recent reported quarter. Net income, however, was a loss of $186 million vs. a loss of $123 million in the year-ago quarter.

Index weight and performance by Geography (%)

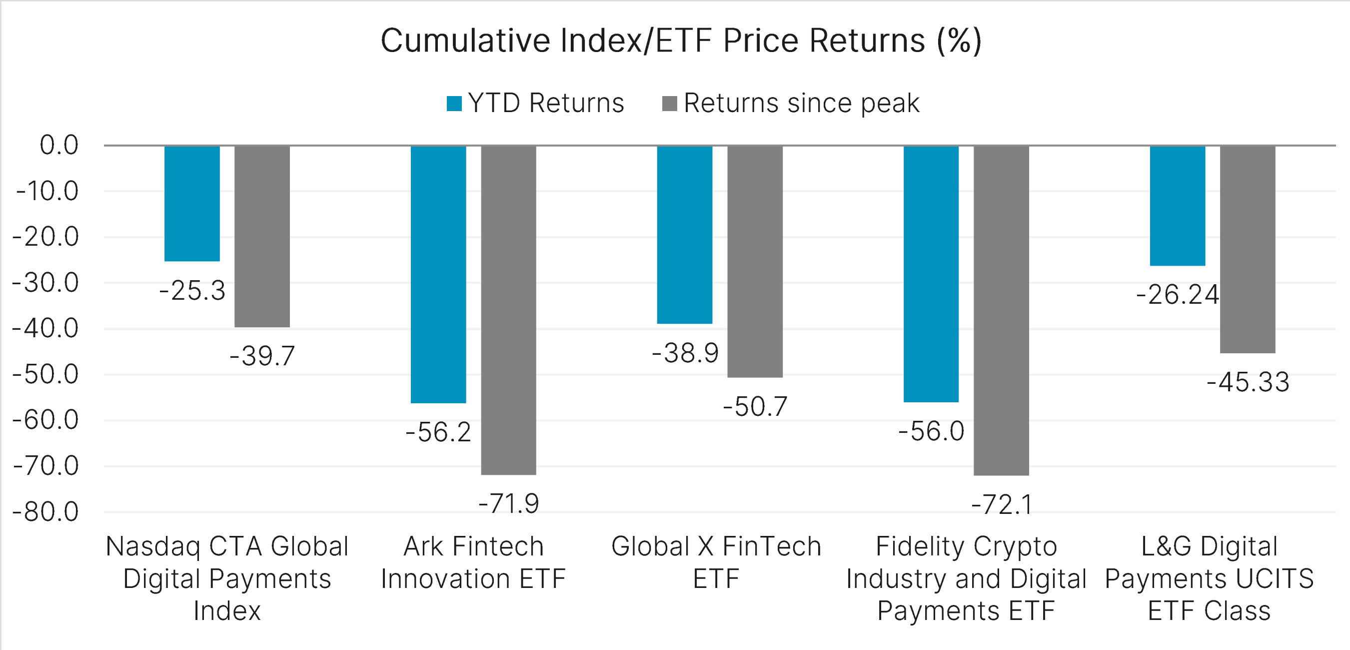


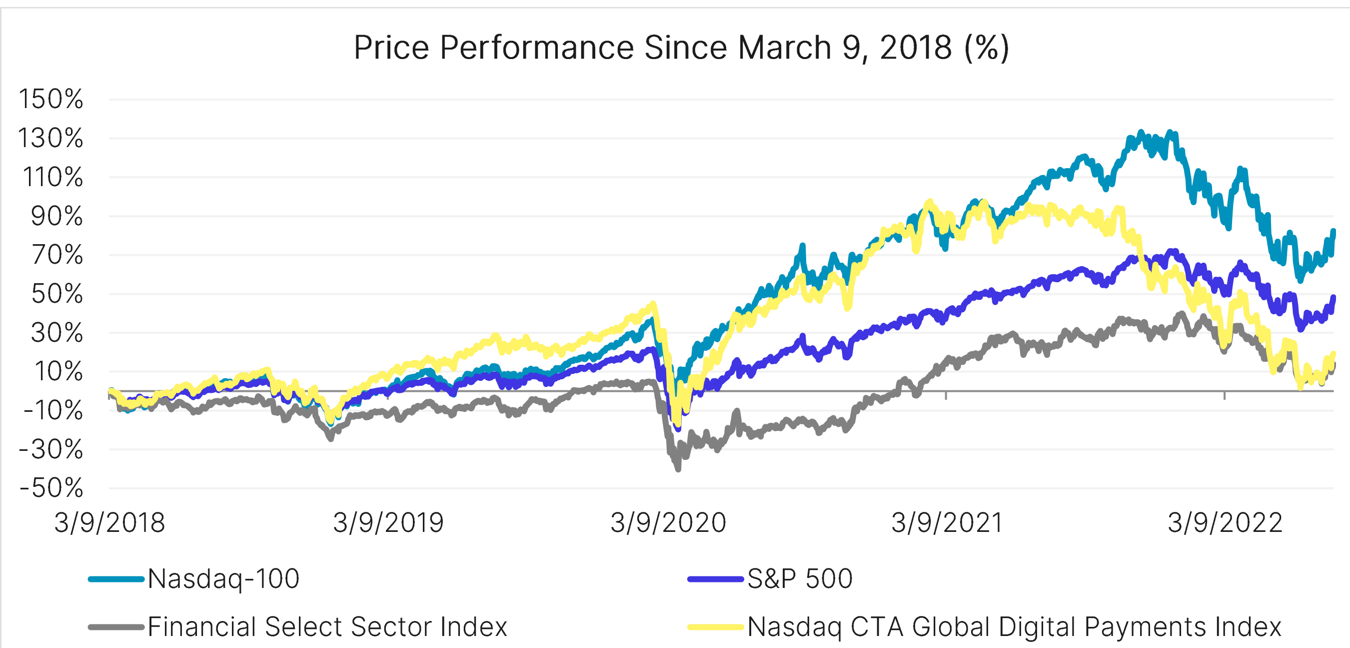


About three-fourths of the index weight is made up of securities based in the United States while about one-fourth of the index comes from international holdings. If we examine the returns across the three time periods, we see that companies based in the US have consistently outperformed. With that in mind, it is worth noting that Asia

Pacific has outpaced other regions in revenue growth over the past decade with a modest pullback in 2020[2]. In general, much of the growth opportunity within fintech and digital payments remains within emerging markets.

Index performance versus Competitor products (%)





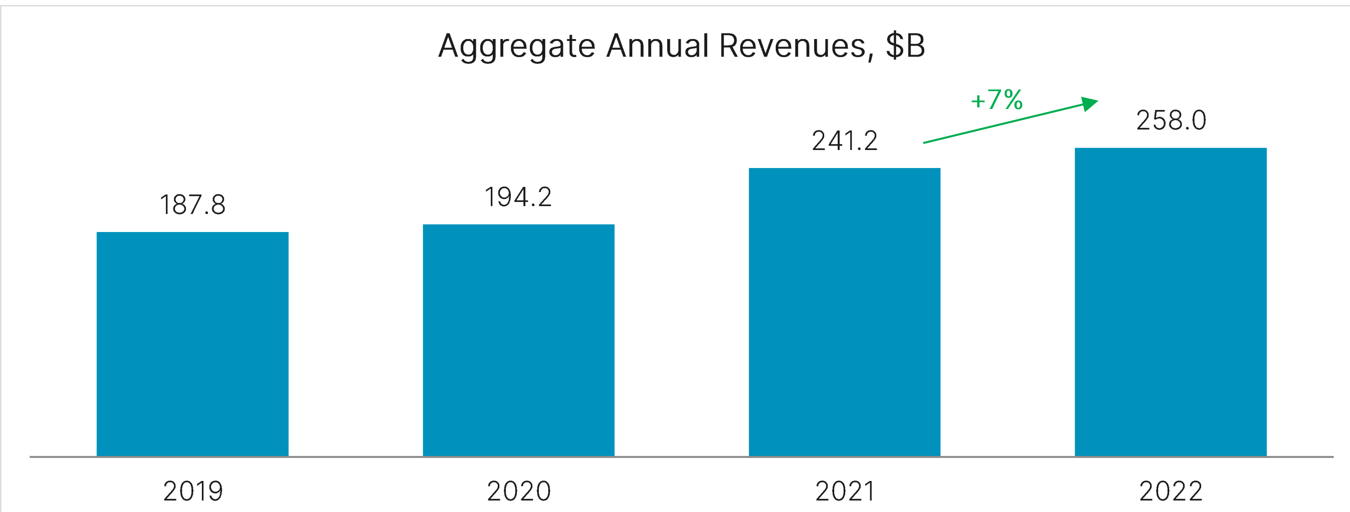
The Nasdaq CTA Global Digital Payments Index has outperformed all four competitor products YTD, registering a decline of 25% as of July 29, 2022. The ARK Fintech Innovation ETF, Global X FinTech ETF, Fidelity Crypto Industry and Digital Payments ETF, and L&G Digital Payments UCITS ETF were down 56%, 39%, 56% and 27%,

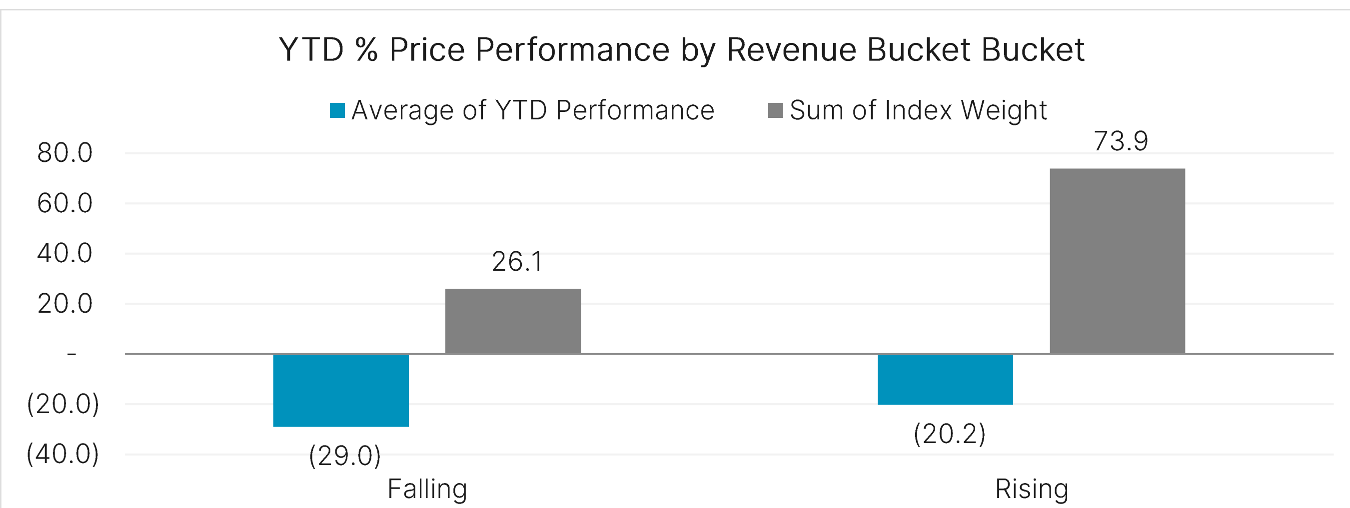
[2] https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/the%202021%20mckinsey%20global%20payments%20report/2021-mckinsey-global-payments-report.pdf

respectively. For the purposes of this analysis, we have tracked the returns of the indexes underlying the Global X FinTech ETF, Fidelity Crypto Industry and Digital Payments ETF and L&G Digital Payments UCITS ETF. For the period since peak, the Nasdaq CTA Global Digital Payments Index was down 40%, again outperforming the other four competitor products on a relative basis. Additionally, since it launched on February 4, 2019, the ARK Fintech Innovation ETF has generated a total return of -10.7%, trailing WALLET by 27.4% as of July 29, 2022. The outperformance of the Nasdaq CTA Global Digital Payments Index vs. its competitors across multiple time periods suggests it is well positioned to continue outperforming, in both up markets and down.

The index's performance versus a broad-based financial sector index for the period March 2018-July 2022 has also been noteworthy. On a cumulative basis, price returns were up 19.3%, outperforming the S&P Financial Select Sector Index (IXM) which was up 13.8%.

Revenue and Earnings Growth & Correlation to Performance

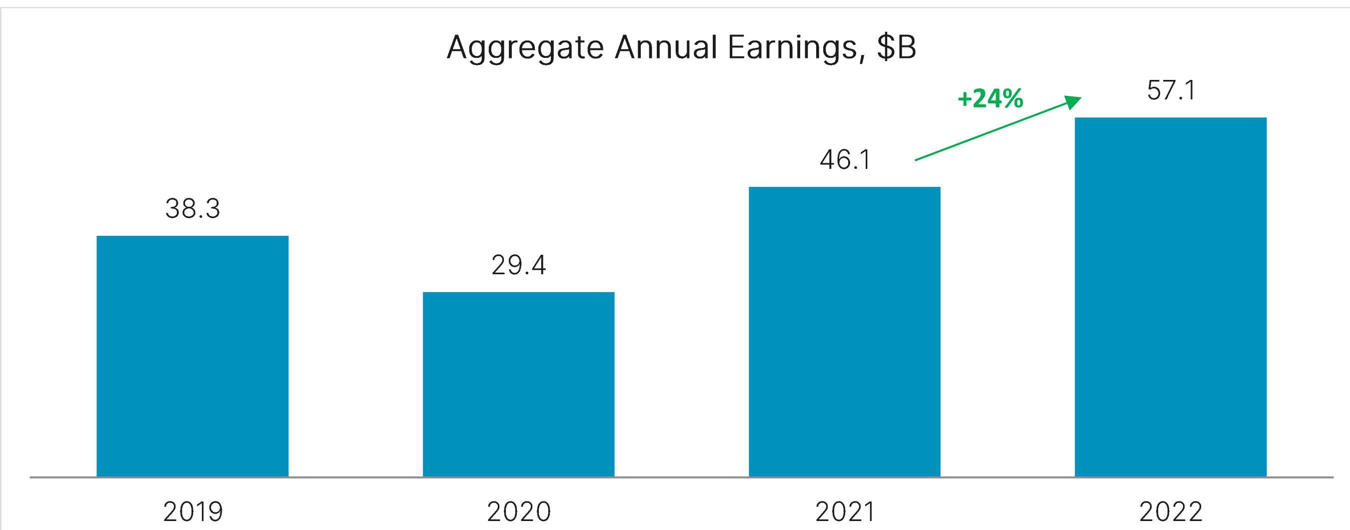




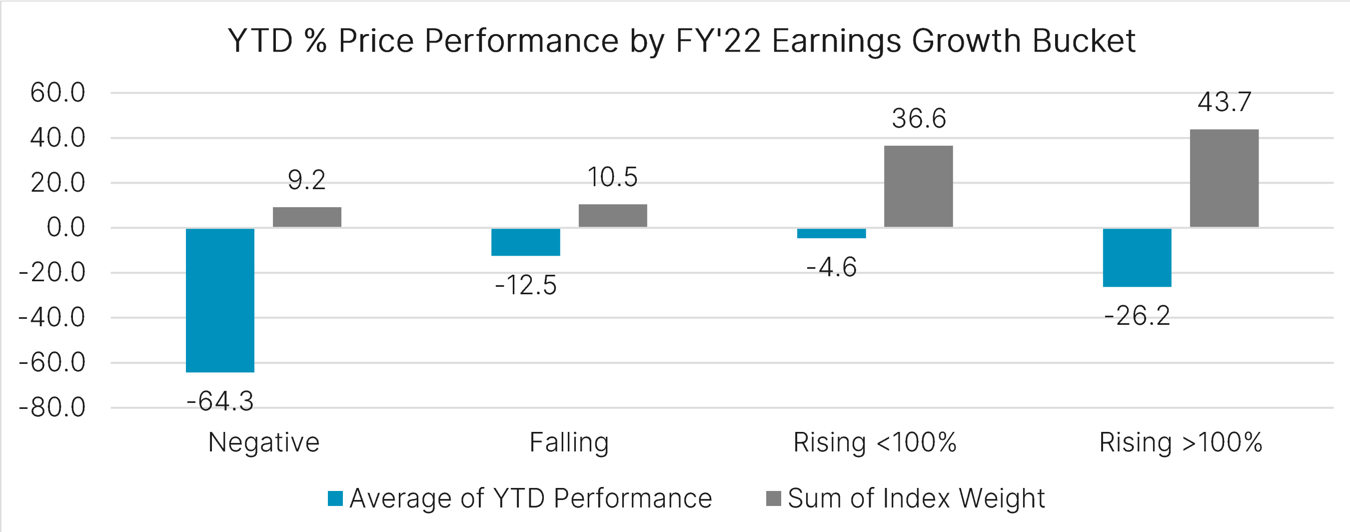
The Nasdaq CTA Global Digital Payments Index continues to show a broadly strong trend in fundamentals, with aggregate revenues across all index constituents forecasted to grow by 7% in FY2022 versus FY2021 (inclusive of 30 companies that have reported 1Q'22 results). 73.9% of the index weight is tied to 30 companies with revenues forecasted to grow in 2022, but as a group, they have only modestly outperformed YTD. On average, companies with forecasted revenue growth in 2022 were down 20% YTD, vs. companies with a forecasted decline in revenue down 29%. This suggests that recent price movements in the index have not been entirely driven by underlying fundamentals.

There was a mild uptick in revenues in 2020 from the prior year, followed by an acceleration in growth in 2021. For 2022, revenues are forecasted to grow at a modest pace, a deceleration from the run-rate in 2021. The pandemic altered the payments landscape significantly, with discretionary spending initially declining by almost 40 percent globally. As the dust settled, profound changes in consumer behavior included online spending rising by 30% from levels in 2019. In 2020, ATM usage fell in countries such as India and United Kingdom due to fears of contracting the virus which, in turn, boosted electronic payment options. Cross-border flows were affected by the pandemic with international travel coming to a halt. Along with the health crisis, companies began to recognize weaknesses in their supply chain. Geopolitical events of 2019 such as the imposition of tariffs by United States on Chinese imports affected the prices of key consumer goods such as clothing, shoes and electronics, which acted as a headwind for the payments industry. All these factors contributed to revenues growing at a modest rate in 2020, followed by a steep acceleration in 2021[3].

With respect to profits, the Nasdaq CTA Global Digital Payments Index also continues to show a broadly strong trend, with aggregate earnings across all index constituents forecast to grow by 24% in FY2022 versus FY2021 (inclusive of 30 companies that have reported 1Q'22 results). Recent performance has not been evenly driven by fundamentals here either, with companies forecasted to have fast earnings growth (>100%) underperforming those with slower expected growth or outright contraction.

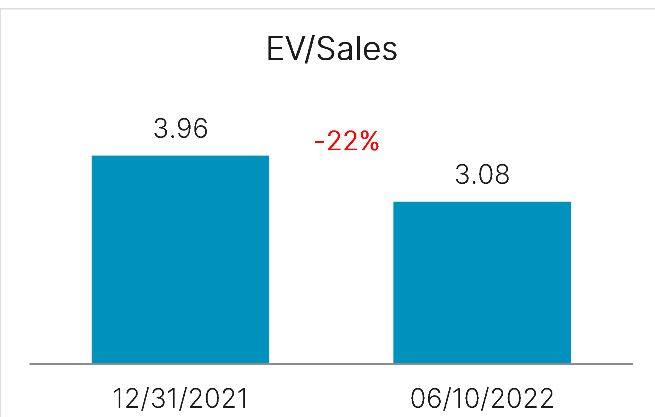


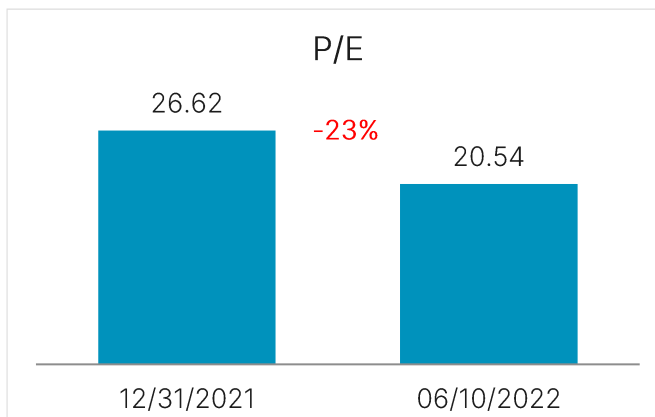
[3] https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/accelerating%20winds%20of%20change%20in%20global%20payments/2020-mckinsey-global-payments-report-vf.pdf

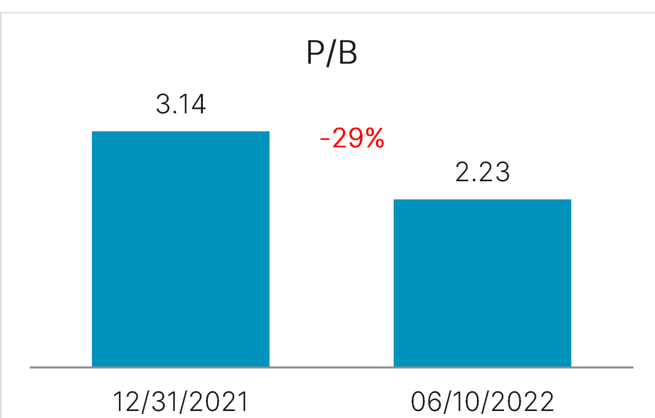


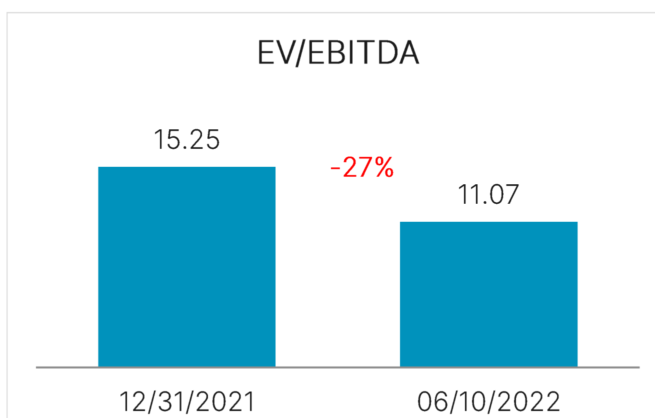
WALLET Valuations Trend

The Nasdaq CTA Global Digital Payments Index has become cheaper by 20-30% year-to-date on a wide variety of index-weighted valuation metrics, including price-to-earnings (P/E), price-to-book (P/B), enterprise value-to-sales (EV/Sales), and enterprise value-to-EBITDA (EV/EBITDA), in-line with the broader market. Recent valuations appear attractive for investors who are looking to stay the course for the long-term, especially if the lows seen in mid June are revisited. While there are near-term headwinds for the sector in terms of high interest rates and high inflation, the sector is well-positioned for growth in the long-term.









Conclusion

The Nasdaq CTA Global Digital Payments Index was down 25% YTD as of July 29, 2022, driven by several headwinds that have weighed on the stock performance of most constituents. Concerns in the macroeconomic environment around the war in Ukraine, lockdowns in China, aggressive Fed tightening, and high inflation have weighed on the minds of investors in general. Inflationary pressures have resulted in lower consumer spending in recent months. This, in turn, resulted in some companies lowering their revenue and earnings outlooks for the rest of the year. Additionally, there were concerns that the shift to digital transactions and online payments during the pandemic was a one-time shift in spending habits that is beginning to revert. While there were revenue gains, they were offset by tightening interest margins[4]. Regulatory concerns have also weighed on some of the newer sub-themes including cryptocurrency and Buy Now, Pay Later.

While the pandemic benefitted digital payment companies, there was less room to run for companies post pandemic with consumers lowering their spending. 2020 was a challenging year for the digital payments industry, with the industry experiencing its first revenue contraction in 11 years. The monetary and fiscal stimulus injected into the economy during this period offset what might have been an even larger revenue contraction.

The recently proposed legislation, the Credit Card Competition Act of 2022, will strengthen competition in the credit card network market as it will require financial institutions with more than $100 million in assets to offer merchants the choice of at least two unaffiliated networks. This is likely to spur competition resulting in lower fees for merchants and small businesses with thin margins. Should this proposed legislation become effective, there might be a reorganization of the existing duopoly of Visa and Mastercard.

With respect to M&A, consolidation has been noticeable across all categories. There were three landmark, multibillion-dollar deals in 2019: the $21.5 billion merger of Global Payments and TSYS; Fiserv buying First Data for $22 billion; and FIS acquiring Worldpay for $35 billion. In 2020, Nexi bought Nets and Worldline bought Ingenico. 2021 was the year of tuck-in acquisitions with companies providing Buy Now, Pay Later capabilities being rapidly acquired. Deal activity in 2021 rose to $60 billion in value from about $40 billion in 2020. For the year 2021, BNPL deals represented 50% of value for all payment deals in 2021. The most noteworthy deal of 2021 was Square's acquisition of BNPL company Afterpay for $29 billion (Square is now renamed Block)[5]. To the extent that acquisitions and mergers continue at a measured pace, there is likely to be an uptick in stock performance.

The month of July saw companies in the index recover some lost ground after a challenging first half of the year in 2022. With the markets gradually factoring in the possibility that inflation has nearly peaked, which would result in a less hawkish Fed, there has been a recovery in fintech stocks and technology stocks broadly. The outlook for the rest of the year appears more optimistic than just a few months ago given some of the recent macroeconomic data.

Over the long-term, there are several secular tailwinds in place, which are likely to benefit companies in the digital payments industry. According to a study by McKinsey, global payments revenue is likely to reach $2.5 trillion in 2025 with a return to mid-single-digit growth rates[6]. There is an ongoing shift towards digital with leading incumbents leveraging current themes such as cryptocurrencies and Buy Now, Pay Later. For example, PayPal allows customers to buy and sell cryptocurrencies on its platform, while Mastercard has rolled out a Buy Now, Pay Later program.

[4] https://www.mckinsey.com/industries/financial-services/our-insights/the-2021-mckinsey-global-payments-report
[5] https://www.bain.com/insights/payments-m-and-a-report-2022/
[6] https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/the%202021%20mckinsey%20global%20payments%20report/2021-mckinsey-global-payments-report.pdf

The transition from cash to card appears to be in the middle stages and is a secular tailwind for the digital payments industry. Ongoing innovation in fintech is likely to spur the creation of new revenue models. Additionally, growing adoption of smart phones in emerging markets will likely spur global e-commerce expansion and serve as a catalyst for stock performance across the index. Threats to larger players including Visa and Mastercard from bank account-to-account (A2A) payments, interchange fee regulation, rising incentives and a European payment initiative appear to be largely overblown. Buy Now, Pay Later is expected to take a larger share of payments from 2% currently to 5-6%, and companies in the space should benefit after working through some growing pains. Finally, the possibility of digital currencies entering the payments ecosystem may act as an added catalyst for stock performance among index constituents exposed to cryptocurrency.

These tailwinds are likely to offset the impact of some companies suspending business in Russia and risks to consumer spending from high inflation and high interest rates. They are also likely to offset the impact from regulatory concerns surrounding Buy Now, Pay Later and cryptocurrency.

The Nasdaq CTA Global Digital Payments Index tracks many of the leading companies in the digital payments industry and is well-positioned to capitalize on broader shifts in the industry.

An ETF currently tracking the index includes the BetaShares Future of Payments ETF.

Sources: Nasdaq Global Indexes, FactSet, Bloomberg, McKinsey