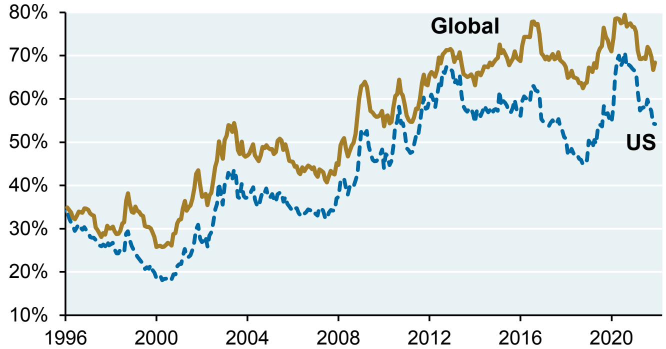
PUBLIC EQUITIES: DIVIDENDS, CYBERSECURITY and FINTECH

[1] Equity dividends: like it or not, dividends are a critical component of yield based investing

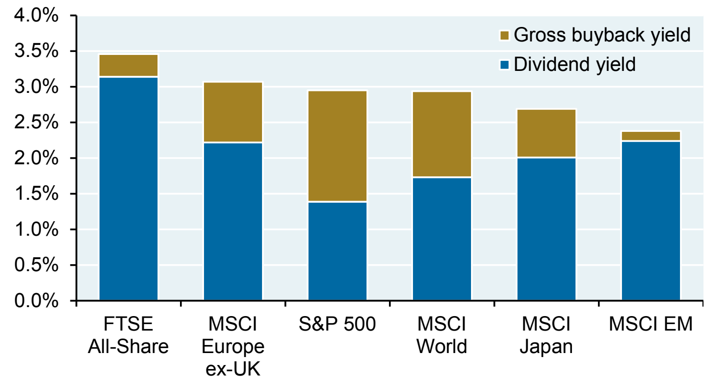
For investors seeking yield, the landscape is as barren as ever. Our Strategic Investment Advisory Group published a paper on this last fall, exploring the likelihood of continued financial repression and its implications for investors. Given prevailing rate trends, investors are increasingly reliant on equities for return and income. Even though equity dividend yields are close to their lowest levels in many years (the S&P 500 dividend yield is just 1.3%), around two-thirds of the income in 60:40 portfolios are now derived from equities, with dividend opportunities even more attractive outside the US. Note that dividend measures for equities do not incorporate gross buybacks, which in the US and Europe can contribute meaningfully to returns.

Equity income in 60:40 portfolios
Dividends as % of total portfolio income



Source: Bloomberg, Datastream, JPMAM. Nov 2021. Based on MSCI ACWI / S&P 500 dividend yield and yield to maturity of Barclays Global / US Agg.

Equity index yields
% yield



Source: Bloomberg, Datastream, JPMAM. September 2021.

The table shows US, European, Japanese and Emerging equity market sectors with the highest dividend yields. The color scheme indicates each sector's volatility over the last 3 years, with red representing the most volatile sector and blue the lowest. Some high dividend yields exist in oil & gas where price volatility can quickly overwhelm a dividend oriented strategy. Yield oriented investors in volatile sectors need to be prepared for long holding periods through difficult times.

Dividend yield by industry group

Industry group	US	EUR	JPN	EM	Average
Mortgage REITs	10.00%	na	na	na	10.00%
Tobacco	6.45%	6.18%	6.05%	na	6.23%
Marine	na	1.48%	9.12%	na	5.30%
Oil, Gas & Consumable Fuels	3.78%	4.86%	4.38%	4.95%	4.49%
Gas Utilities	2.82%	5.34%	3.02%	5.34%	4.13%
Diversified Telecommunication	4.22%	4.35%	3.52%	4.38%	4.12%
Construction & Engineering	na	4.17%	3.62%	4.19%	3.99%
Insurance	1.65%	4.31%	4.35%	4.08%	3.60%
Electric Utilities	3.14%	3.88%	2.94%	4.03%	3.50%
Banks	2.44%	3.18%	4.34%	2.93%	3.22%
Multi-Utilities	3.02%	3.36%	na	3.13%	3.17%
Telecommunication Services	0.00%	5.71%	3.49%	na	3.07%
Equity Real Estate Investment	2.70%	2.58%	3.49%	2.33%	2.78%
Water Utilities	1.66%	3.66%	na	na	2.66%
Metals & Mining	1.95%	4.11%	3.32%	1.20%	2.64%
Paper & Forest Products	na	2.47%	2.51%	2.88%	2.62%
Capital Markets	1.53%	2.10%	4.30%	1.92%	2.46%
Containers & Packaging	2.16%	2.40%	na	2.40%	2.32%
Construction Materials	0.63%	3.35%	na	2.89%	2.29%
Chemicals	1.87%	2.28%	2.46%	2.48%	2.27%
Energy Equipment & Services	1.81%	2.48%	na	2.48%	2.25%
Pharmaceuticals	1.87%	2.46%	2.15%	2.43%	2.23%
Media	1.02%	2.17%	1.43%	4.17%	2.20%
RE Management & Development	0.00%	2.47%	2.74%	3.50%	2.18%
Household Durables	1.42%	3.69%	1.91%	1.55%	2.14%

Highest volatility
Lowest volatility

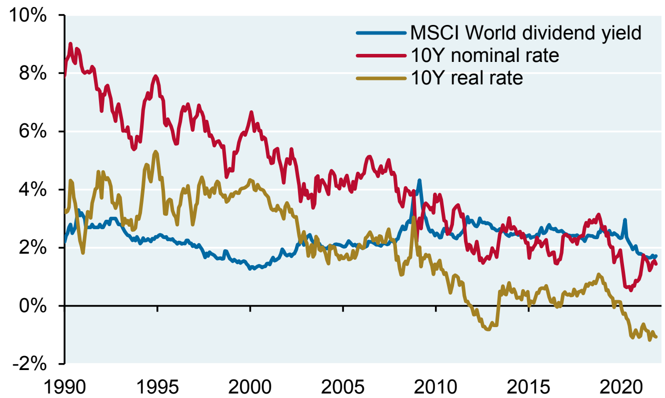
Source: Bloomberg. December 29, 2021.

For investors in US equity markets, dividends have not been a critical part of total return. For the 10 year period ending 12/31/2020, US large cap stocks had an annualized total return close to 14%; only 2.1% of this return came from dividends. However, this same was not the case in international equity markets. Investors in portfolios linked to the MSCI EAFE Index (Europe, Australasia, Far East) earned annualized total returns of just 6%, with 3.3% coming from dividends (more than half of the return). Dividends contributed an even larger share of returns in emerging markets (dividend return of 2.84% out of an annualized return of just 4%).

While there is plenty of dispersion in dividend contributions to total returns by region, longer time frames show more similarity. Since 1929, dividends have contributed 38% of total returns in the US. Data doesn't go back as far for non-US markets; developed international equity market data begins in 1986. Over this time period, dividends contributed 33% of total returns, and since 2001, Emerging Market dividends have contributed 29% to total returns. In other words, over the long run, dividend contributions to returns are more similar by region.

While implied dividend yields might seem low compared to history, we believe that MSCI World dividend yields will exceed nominal and real yields on US gov't bonds. That has been the case since the Global Financial Crisis, a trend we expect to continue. Payout ratios appear sustainable, and companies have plenty of cash on their balance sheets.

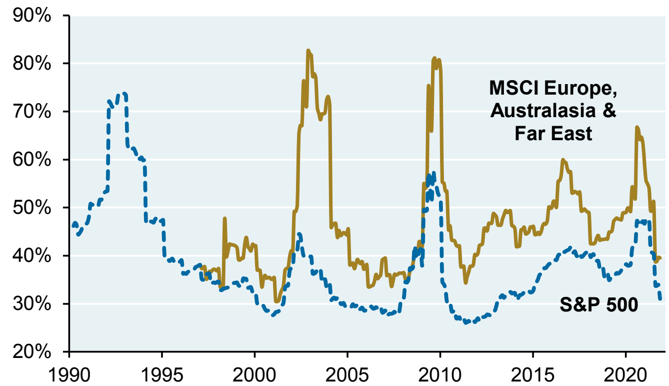
MSCI World dividend yield vs US 10Y bond yield



Source: Factset, Bloomberg, JPMAM. November 2021.

Dividend payout ratios

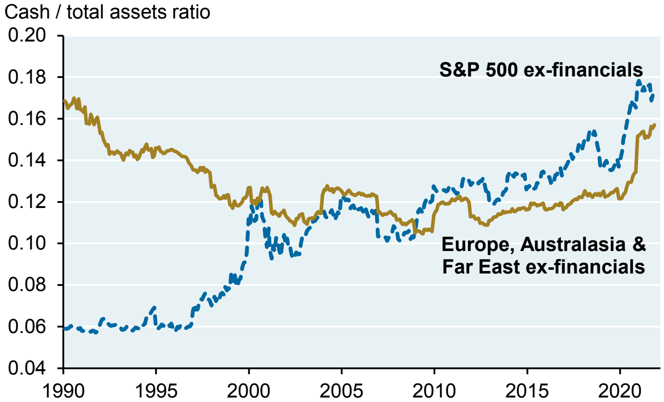
Dividend share of net income



Source: Factset, JPMAM. November 2021.

Corporate sector cash balances

Cash / total assets ratio



Source: Factset, JPMAM. November 2021.

[2] Cybersecurity investing: innovation and evil collide, providing opportunity for investors

Cybercrime is a depressing and nihilistic manifestation of human nature and a reminder that progress does not come without associated costs. Almost every month we read about another significant data breach and in December 2021, the cybersecurity community discovered the Log4Shell vulnerability[4], described by some as the single largest and most critical vulnerability to date.

- **February 2021:** A breach at a third-party cloud provider allowed hackers access to Kroger's Human Resources data and pharmacy records, resulting in ~1.5 mm records breached (names, phone numbers, addresses, dates of birth, Social Security numbers, prescriptions and health insurance information)
- **May 2021:** Colonial Pipeline carries 45% of East Coast petroleum, diesel and jet fuel and was compromised by hackers who stole 100 gigabytes of data, threatening to release it unless a ransom was paid. Gas prices rose and shortages took place until Colonial Pipeline paid a ransom in Bitcoin
- **July 2021:** The US, EU, UK, and NATO jointly attributed a Microsoft Exchange Server breach to affiliates of the Chinese government's Ministry of State Security. In response, US intelligence agencies released a cybersecurity advisory to disclose additional vulnerabilities stemming from China-affiliated attackers
- **August 2021:** T-Mobile disclosed a breach exposing personal information that affected over 40 million customers; the attacker identified an internet-facing router in a corporate data center and offered the data for sale in a criminal forum

The cybersecurity industry has room to grow if the latest projections of cybercrime, online migration, corporate/government spending and current vulnerabilities are correct[5]:

- Annual cybercrime costs are expected to grow from $6 trillion today to $10.5 trillion by 2025
- Global cybersecurity workforce needs to grow 89% to effectively defend critical corporate assets
- 44% of workloads are expected to be on the cloud by the end of 2021, and 55% by 2022
- 82% of organizations claim traditional security tools don't work or have limited functionality
- 77% of remote employees use unmanaged devices
- 85% increase in phishing attacks targeting remote enterprise users[6]

Unsurprisingly, cybersecurity spending is expected to grow from $140 billion in 2021 to $180 billion by 2024, including $2 billion in the 2021 COVID-19 relief bill and another $2 billion in the infrastructure bill. **Nature abhors a vacuum, so a growing number of companies are trying to address the vast array of cyber risks facing an increasingly online world.** Some notable capital raised in 2021:

- **July 2021:** Riskified achieved a $3.3 billion valuation through its IPO. Its products are part of the "chargeback guarantee category" of fraud prevention, referring to vendors that accept liability for disputed transactions
- **September 2021:** Snyk, a development operations security platform, raised $605 million in a round that carried a valuation of $8.6 billion; ForgeRock (access management) achieved a $2 billion valuation via IPO
- **November 2021:** Cloudflare and Crowdstrike, the two leading cloud based cybersecurity companies which went public in 2019, now have a combined market cap of over $125 billion
- **Other 2020 / 2021 unicorns:** SentinelOne, Verdaka, Arctic Wolf, Cato Networks, BigID, Armis Security, Coalition, Wiz, OwnBackup, Axonius, Socure, Orca Security, Lacework and Aqua Security

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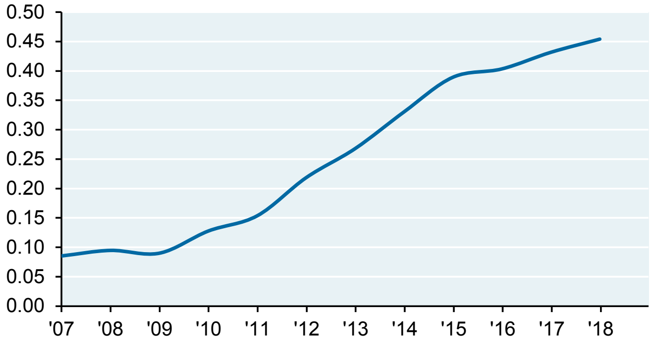
[4] **Log4j** is an open source logging framework that reportedly allow requests to servers without checking responses, allowing attackers to execute Java code and/or leak sensitive information

[5] **Sources**: Cybersecurity Ventures; ISC2 Cybersecurity Workforce Study; American Rescue Plan; Wedbush Securities; Cybersecurity Insiders' Cloud Security Report; Pitchbook Security Report; Warburg Pincus

[6] I am sorry to report that **I failed a firmwide phishing test** this year (for the first time) when I clicked on an attachment from an email I thought was from DHL to reschedule a delivery.

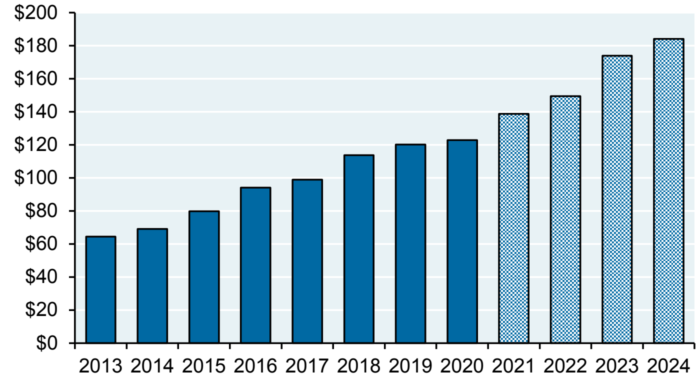
When did cybercrime start to rise? The first chart shows a proxy for cybersecurity risks drawn from company disclosures. Cyber risks existed before the financial crisis but were generally small; they started to accelerate in 2011. The second chart shows actual global cybersecurity spending, with estimates to 2024. Part of the reason for the rapid rise: **lower risks of being a cybercriminal vs risks associated with other criminal enterprises**.

Cybersecurity risk proxy
Cybersecurity risk measure derived from company risk disclosures



Source: *"Cybersecurity Risk"*, Florackis et al., Chicago Booth/Swiss Finance Institute. December 2020.

Global security spend estimates
US$, billions



Source: Warburg Pincus, CS, Gartner. May 2021. Dotted bars = estimates.

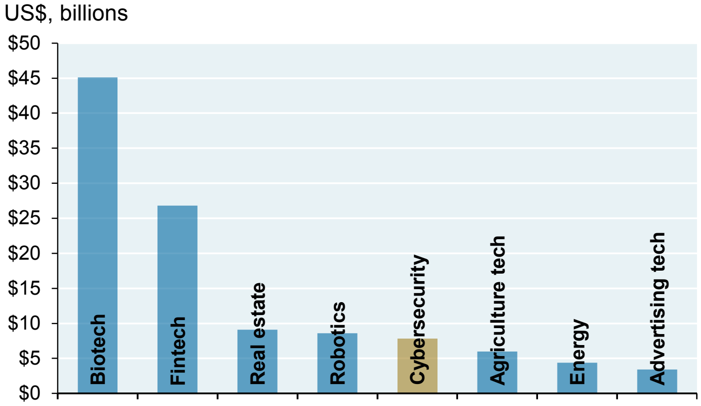
Here's a snapshot of the cybersecurity ecosystem. There's a broad range of cybersecurity vulnerabilities and companies aimed at addressing them. The largest cyber companies are often not as good at innovation as smaller ones, creating ample opportunities for consolidation. For context, cybersecurity venture capital funding is now on par with robotics, another "future shock" industry.

Information security ecosystem

Security operations	Network security	Data security	Application security	Endpoint security	Identity & access management
Managed security services	Cloud security	Database monitoring & loss prevention	Web application protection	Endpoint protection, detection & response	Access management
Log ingestion & security information and event management	Network detection & response	Data privacy & compliance	Cloud workload protection platforms	Internet of things & operational technology security	Fraud prevention
Vulnerability assessment & management	Secure networking	Data protection & encryption	DevOps security platforms	Anti-phishing platforms	Identity governance & administration
Security orchestration, automation & response			Web3 security		

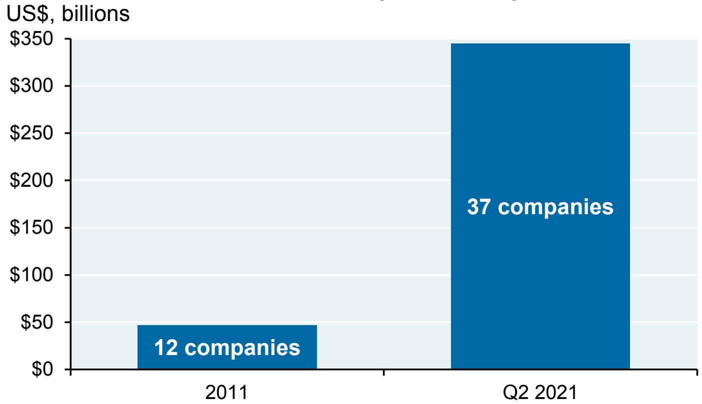
Source: PitchBook, JPMAM. 2021.

2020 venture capital funding by sector
US$, billions



Source: Crunchbase. 2021.

Market capitalization of public cybersecurity companies
US$, billions

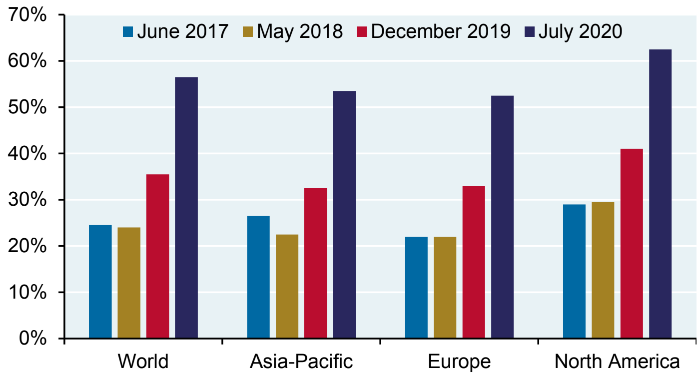


Source: Ten Eleven Ventures. Q2 2021.

COVID accelerated the transition to a more digitized world, which increases vulnerability. McKinsey found that corporate respondents were three times more likely than before COVID to conduct at least 80% of their customer interactions online[7]. Their product and service offerings were also digitized at twice the rate that they were before COVID.

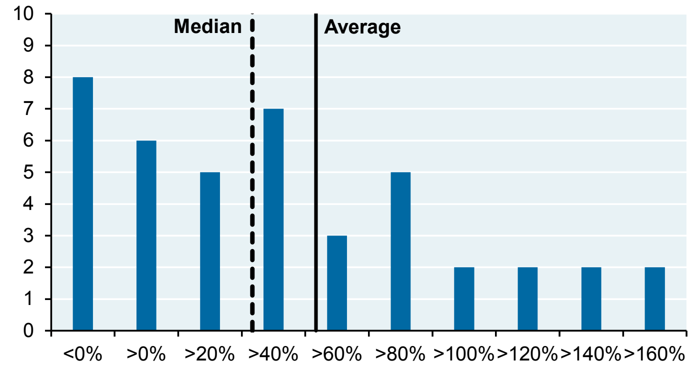
Another major cybersecurity growth sector: energy. Electrification of transportation, industrial energy use and commercial/residential winter heating offers the potential for decarbonization if more wind, solar, hydro and nuclear are added to the grid. But it raises the stakes even further regarding the security of the electricity grid, since even temporary disruptions would cause even greater economic and physical distress.

The COVID impact: rising share of customer interactions, products and services that are digital, %



Source: McKinsey. October 2020.

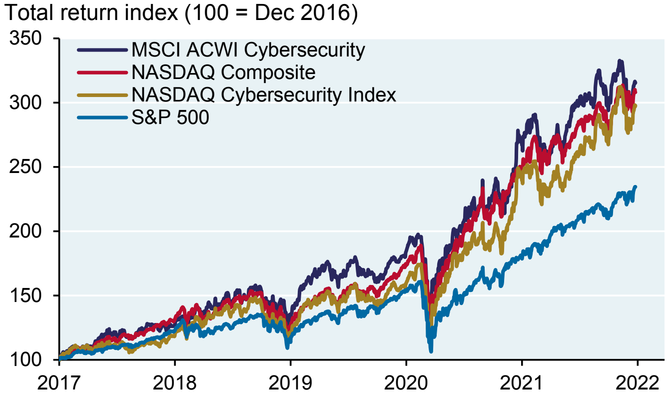
Distribution of cybersecurity total returns since Jan 2020
Number of companies in NASDAQ Cybersecurity Index (n=42)



Source: Bloomberg. December 29, 2021.

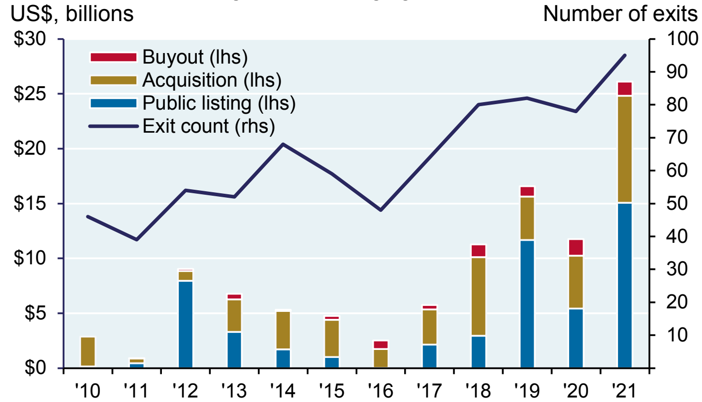
Public cybersecurity indexes have performed well since 2017, either in line with or exceeding the NASDAQ. As shown below (right), there has also been a growing number of cybersecurity firm exits by VC firms as the industry matures. However, as is typically the case with an emerging industry, dispersion across individual cybersecurity company returns is quite high (some big winners and losers). That is illustrated above: average returns are much higher than median returns.

Cybersecurity performance
Total return index (100 = Dec 2016)



Source: Bloomberg, JPMAM. December 29, 2021.

Information security VC exits by type
US$, billions
Number of exits



Source: Pitchbook. Q3 2021. Includes exits in North America and Europe.

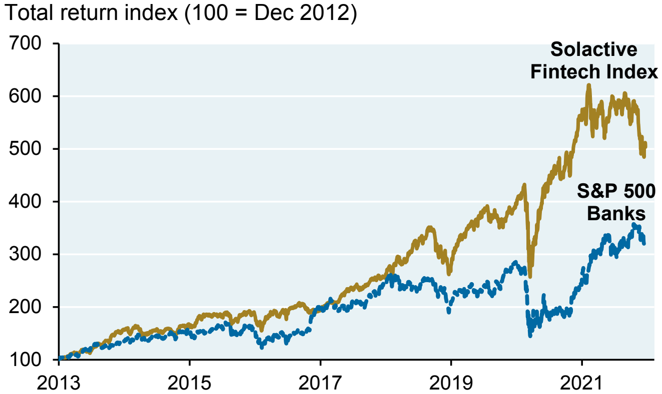
[7] "*How COVID-19 has pushed companies over the technology tipping point and transformed business forever*", McKinsey, October 2020

[3] F is for Fintech…and also for fear, fraud and foreclosure

There have been attractive opportunities in Fintech given greater reliance by businesses and households on internet based solutions and digital interfaces. In our wealth management business, we designed investment products that focus on both public and private Fintech companies. Fintech valuations are often higher than traditional banks despite having similar profitability. Fintech is a cycle-sensitive industry given its laxer underwriting standards; in an expansion with low household default rates and foreclosure/eviction moratoria (fourth chart below), Fintech *should* outperform traditional banks since they take more risk.

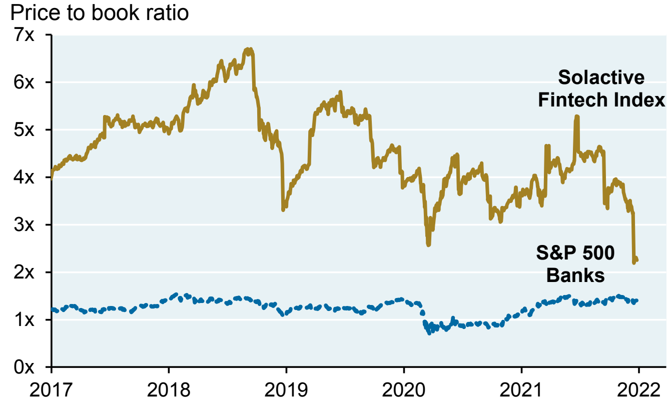
That said, the Fintech industry often relies more on regulatory arbitrage than on providing lower costs or greater speed of access[8]. How long will regulatory arbitrages exist? US regulators are often reluctant to infringe on sectors it sees as delivering innovation, but there are indicators emerging that Fintech does not always function the way it's expected to. **On the following pages, we cite three examples from the COVID period:** the disappearance of Fintech lenders during early stages of the pandemic; the very high estimated incidence of Fintech borrower fraud on PPP loans; and evidence that Fintech lending resulted in more poorly underwritten loans with greater risk of default. **This evidence from COVID builds upon prior research showing greater systemic risks from Fintech lending (see footnote on p.23).** We're watching to see what impact this might have on regulatory oversight of Fintech companies, and how their costs and business models evolve.

US fintech vs bank performance
Total return index (100 = Dec 2012)



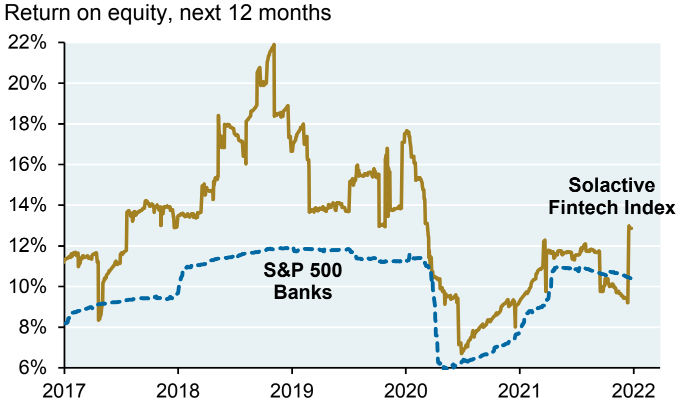
Source: Bloomberg, JPMAM. December 28, 2021.

US fintech vs bank valuations
Price to book ratio



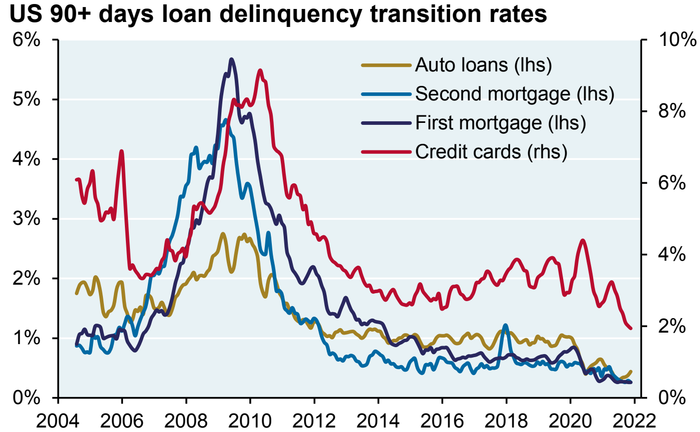
Source: Bloomberg. December 29, 2021.

US fintech vs bank profitability
Return on equity, next 12 months



Source: Bloomberg. December 29, 2021.

US 90+ days loan delinquency transition rates



Source: S&P Dow Jones Indices, Experian. November 2021.

[8] *"Fintech, Regulatory Arbitrage and the Rise of Shadow Banks"*, Buchak (University of Chicago) et al, May 2018. This study found that around 60% of the increase in Fintech's share of mortgage lending can be attributed to regulatory arbitrage, and only 30% to improved technology and speed of access.

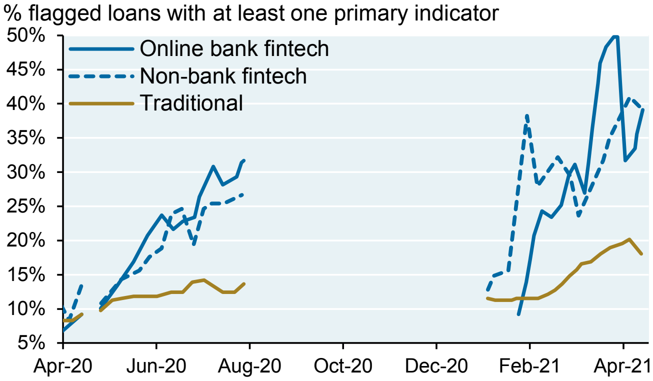
Strike One: High rate of probably fraudulent Fintech PPP loans

Fintech lenders started out with small PPP loan volumes, but eventually ramped up their market share to over 70% of PPP loans by April 2021. A big data analysis was applied to 10 million PPP loans, applying 4 primary indicators of potential fraud and 5 secondary fraud indicators. Primary fraud indicators include: non-registered businesses, multiple businesses at a single residential address, abnormally high implied compensation per employee, and large inconsistencies in jobs reported on PPP loans compared with information supplied to another government program. Secondary fraud indicators include a comparison of PPP loans within a given industry-county, and the number of establishments that actually exist within that industry-county.

Results:

- Fintech PPP loans were 4.7 times as likely to have a primary fraud indicator that is confirmed by an additional primary or secondary fraud indicator than traditional bank loans
- Nine of the ten lenders with the highest rates of suspicious loans in the analysis are Fintech lenders
- When grouped by industry and county, 35% of Fintech loans exceeded the number of companies that *actually exist* in that industry and county; 28% of Fintech loans exceeded industry-county establishment counts by a factor of more than two (!!)
- Some Fintech lenders had very high concentrations of questionable loans, with 45% subject to one or more of the fraud indicators
- Fintech PPP borrowers were 3.5 times more likely to have a felony record
- Few of these questionable Fintech PPP loans were detected by the Federal gov't or repaid
- Fintech lenders with the highest share of questionable loans in 2020 increased their market share in 2021. In the early stages of the PPP, about 10% of Fintech loans were potentially fraudulent; the percentage of suspicious Fintech loans increased to more than 40% by the end of round 3

Potentially fraudulent loans by lender type
% flagged loans with at least one primary indicator



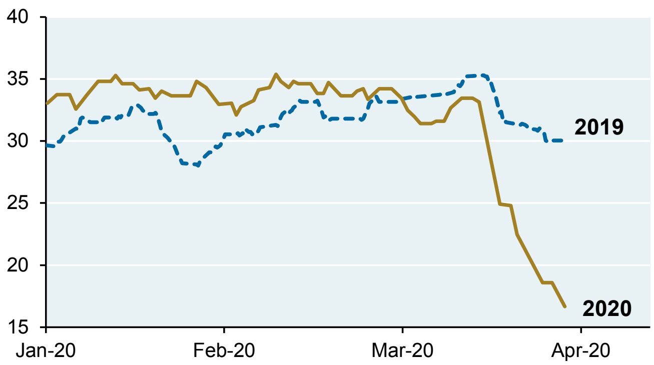
Source: *"Did Fintech Lenders Facilitate PPP Fraud?"*, Griffin, Kruger and Mahajan (UT Austin). August 2021.

Strike Two: A collapse in US Fintech small business lending during COVID

Fintech small business lending collapsed during the early stages of the COVID recession while traditional banks kept on lending to US companies and households. Fintech lending did not revive until the PPP program took place, raising questions about Fintech lending during a recession in the absence of massive government support. Some facts and figures:

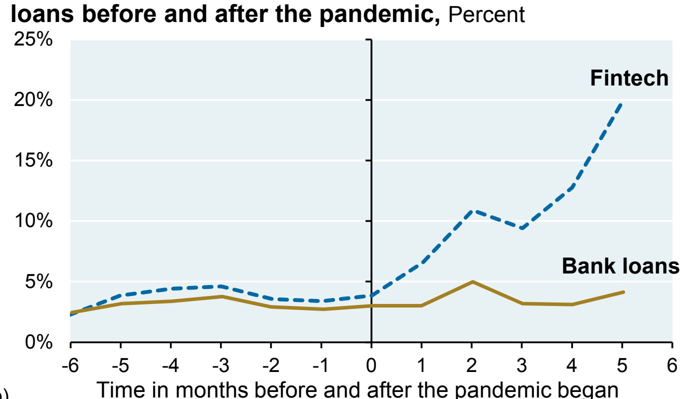
- Fintech lending to small business declined by 75% from Q4 2019 to Q2 2020. Out of 16 Fintech lenders that originated small business loans before COVID, only six were still originating loans in Q3 2020
- There's no evidence of an equivalent collapse in bank loans to small businesses during the same period (C&I loans increased by $482 billion between March 11 and April 1)
- A collapse in Fintech lending to small businesses was a major factor reducing active small businesses by 22% from Feb 2020 to April 2020. The decline in Fintech lending took place despite the average Fintech loan applicant being of higher credit quality compared to the Fintech loan book from 2019
- The largest single factor explaining this result: financial constraints facing Fintech lenders

Active fintech lenders
# of lenders



Source: *"Why Did Small Business Fintech Lending Dry Up?"*, Ben-David (Ohio) et al. August 2021.

Delinquency rates for Chinese bank loans and fintech loans before and after the pandemic, Percent



Source: *"Shadow Banking in a Crisis"*, Bao and Huang (Monash). Nov 2020.

Strike Three: Evidence from China on higher default rates for Fintech loans vs bank loans during COVID

In the US, PPP loans and other policy measures helped borrowers avoid default. As a result, there's not much empirical evidence regarding risk of Fintech loans vs bank loans during COVID. However, in China there were fewer protections for borrowers, so we can compare loans more readily. As shown above (right), the COVID shock resulted in a surge in Fintech loan delinquency rates while bank loan delinquency rates remained roughly constant. The gap is not explained by first time Fintech borrowers; many borrowers had both Fintech and bank loans, and had a higher propensity of defaulting on Fintech loans. This data is from China, but given what we know about US fintech lending before COVID[9], I'm inclined to see these results as representative of what one might expect from US Fintech loans during a recession in the absence of government support.

[9] **Pre-COVID research on Fintech systemic risks**:

- Consumers turning to Fintech lenders are more likely to spend beyond their means, sink further into debt and default more often than people with similar credit profiles borrowing from traditional banks. Source: DiMaggio (HBS) and Yao (Georgia State University), 2020.
- An analysis of the LendingClub platform found that borrower misinformation does not negatively impact underwriting decisions; and that incomplete income verification by the platform on loan applications negatively affects recovery rates. Source: "*Fintech platforms: Lax or careful borrowers' screening*", Serena Gallo (University of Campania), July 2021.

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