Fear of Flying[1]

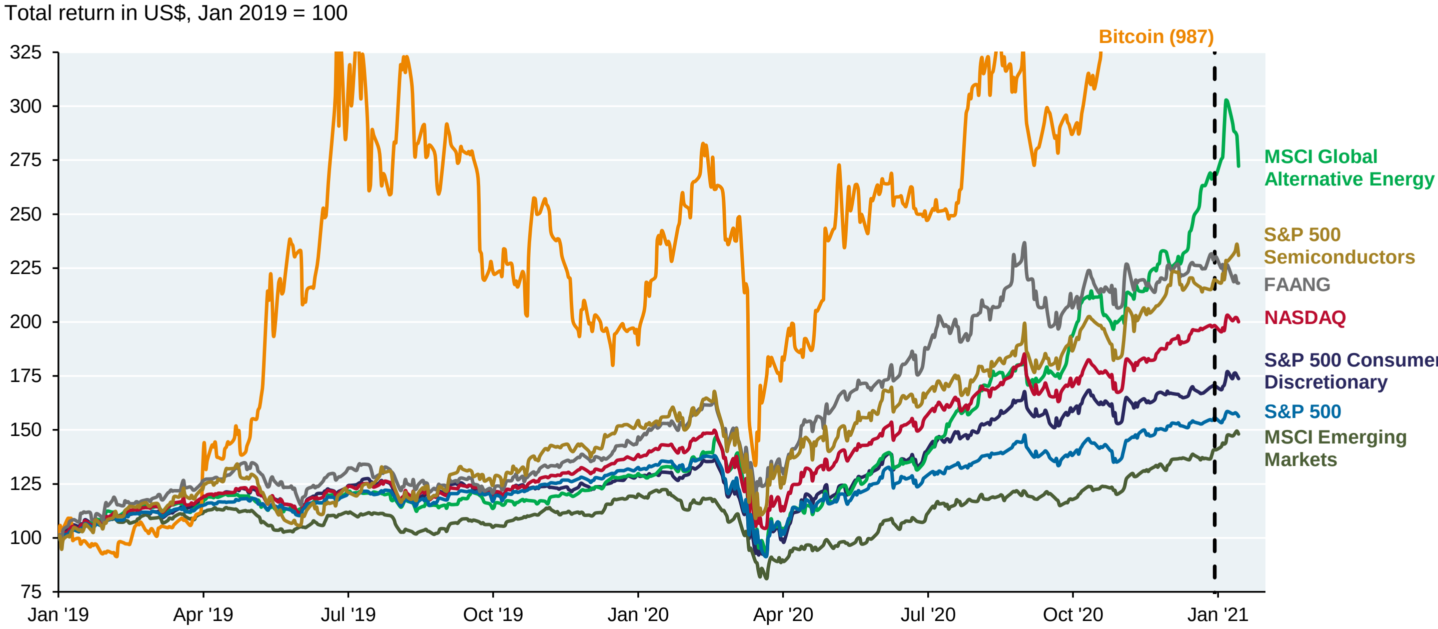
Equity markets are flying. So is COVID. So are corporate reactions to Congressional objectors.

Today's note covers the following topics, mostly through charts:

- Soaring equity markets, fully-invested market participants and a collapse in risk aversion
- Icarus Moment: Megacaps stocks run into headwinds and the nightmarish id of American internet users
- COVID is taking off again as mutations increase while vaccinations are creeping higher at a slower pace (please join me this Thursday on a webcast with Moderna CEO Stéphane Bancel)
- Jan 6th Capitol Building riot aftermath: the fly, corporate PACs and Congressional objectors
- While there's still a fear of actual flying, oil consumption and oil related stocks are recovering
- The flightless moa: European equities

Since last April, equity markets have been on a tear with many of the indexes below rising at 90%-130% on an annualized basis. **We expect a global rebound in growth, corporate profits and employment this year but investors should be wary of one-directional markets after last year's rally, and given uncertainties on COVID mutations and vaccine efficacy**. Keep some dry powder around: our view for 2021 is rising markets with bouts of intense profit-taking at points along the way.

All Systems Go
Total return in US$, Jan 2019 = 100



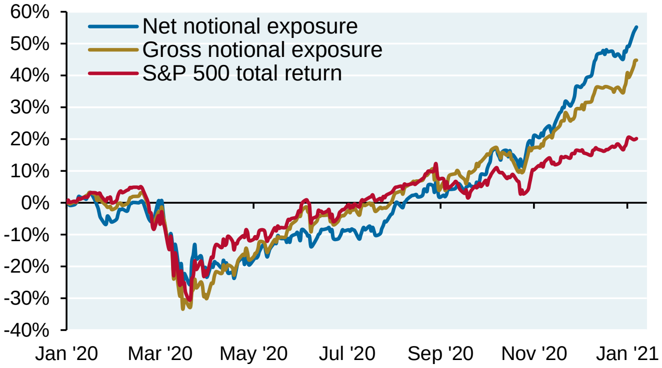
Source: Bloomberg. January 15, 2021.

[1] In 1973 a novel entitled "**Fear of Flying**" by Erica Jong was popular in many households. Jong's novel might just seem like a predecessor to the "50 Shades" books, but at the time it was praised by authors John Updike and Henry Miller, and was also well-received by New York Times Book Review critic Christopher Lehmann-Haupt. I think my parents had a copy, but I was 11 and did not read it.

Why are equity markets soaring? Everyone is invested

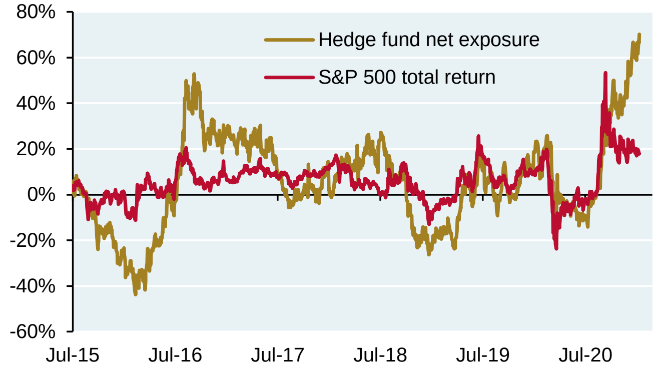
In our 2021 Outlook we discussed the high level of optimism of individual investors and equity mutual fund managers. Today, we round out the picture with data from JP Morgan's Prime Brokerage group which covers hedge funds. As you can see, **gross and net hedge fund exposures have been rising rapidly as well**. Towards the end of last year, exposures were rising faster than the market itself.

North America hedge fund exposures vs S&P 500
% change since January 2020



Source: J.P. Morgan Positioning Intelligence. January 13, 2021.

Hedge fund net exposure and S&P 500 returns
6-month % change



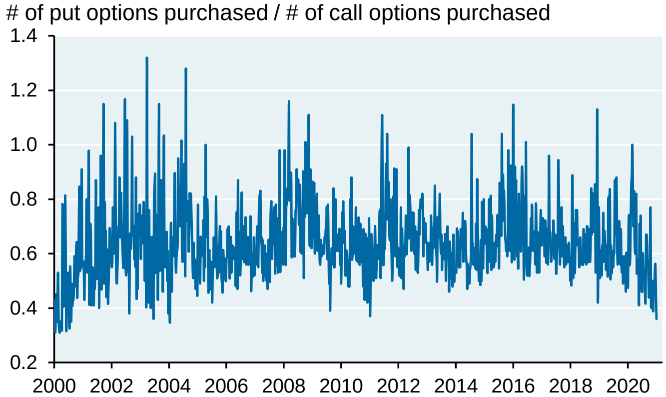
Source: J.P. Morgan Positioning Intelligence. January 13, 2021.

There has also been a painful short squeeze: the chart on the left shows how the 50 stocks in the Russell 3000 with the greatest degree of short interest have been soaring, suggesting a lot of **forced short covering**. Also at the highest level since 2000; the # of stocks that have doubled in the last 3 months that now trade at over 10 times sales (there are 59 of them). On the right: a collapse in the "put/call" ratio, which indicates a decline in risk aversion and portfolio insurance.

Short squeeze
Index level, 50 highest short interest names in the Russell 3000

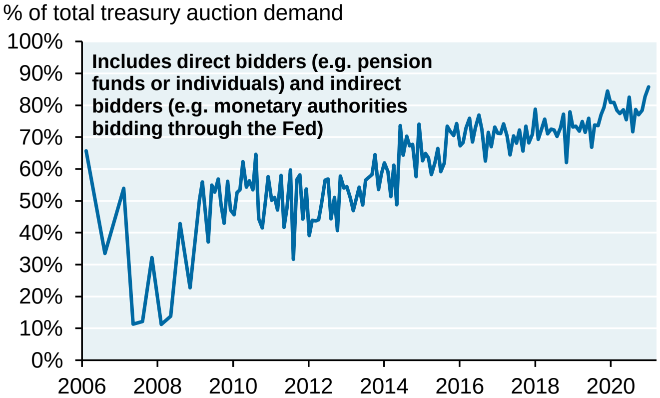
Source: Bloomberg. January 15, 2021.

Equity put-call ratio
# of put options purchased / # of call options purchased



Source: Chicago Board Options Exchange, Bloomberg. January 15, 2021.

Investor demand at 30-year treasury auctions
% of total treasury auction demand



Source: Bloomberg, JPMAM. January 13, 2021.

While stocks are flying, there's still demand for long-duration fixed income. All it took was a 20 basis point backup in yields at the long end to draw in a lot of interest. Investor demand for the 30 year UST reached the highest level since 2006 (i.e., net demand from everyone but broker-dealers). **We expect yields to rise further this year; after all, the US is on a path to a 10% deficit in 2021 and that's before any future stimulus bills. Biden's proposal is for another $1.9 trn in spending, but it faces a long road in Congress.**

Icarus Moment: Megacaps run into headwinds and into the nightmarish id of American internet users

The longest section in our 2021 Outlook deals with challenges facing megacap stocks in the form of antitrust issues, rising corporate tax rates, new proposed taxes on low tax jurisdictions and digital service taxes. **We began highlighting these risks last summer, and by Labor Day concluded that the best days of megacap outperformance might be behind them**. Since then, that's what has been happening. The events of the last 2 weeks are also part of the story: since the early 1900's, **once companies reach enormous size/scope, there can be a reaction by governments and citizens against such concentrations of power**[2]. Like Icarus, some of these stocks have been flying very close to the sun.

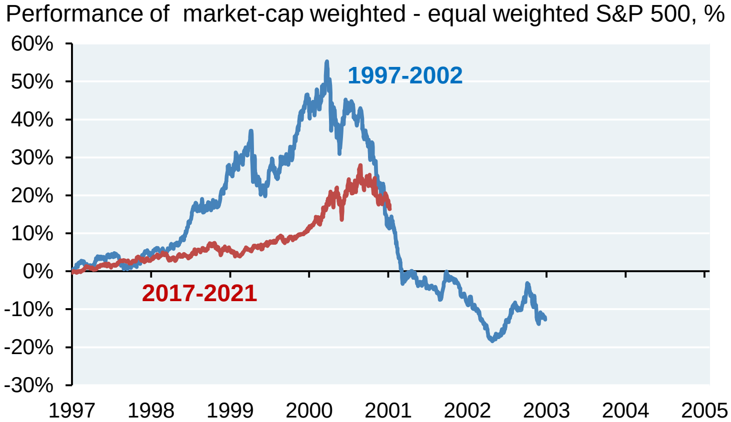
There are other places you can go for legal commentary on the dispute between Amazon Web Services and Parler[3]. But to understand the difficult choices that social media and web hosting companies face in providing a "town square for people to discuss their views", **pull up an online copy of Amazon's response to Parler's lawsuit** (which you can find on Business Insider). Go to pages 4 and 5 for examples of what AWS found on Parler, which is a sampling of the nightmarish id of American internet users.

	Total returns since:		
	Jun '20	Sep '20	Jan '21
Antitrust targets (AAPL, AMZN, FB, GOOGL; equal-weighted)	30.1%	-4.7%	-4.6%
S&P 500 (market cap weighted)	25.1%	8.3%	0.4%
S&P 500 (equal-weighted)	32.0%	18.7%	2.8%

Source: Bloomberg. January 15, 2021. Secular growth stocks: S&P 500 companies with 2018 & 2019 sales growth > 10%; projected 2022 sales growth > 10%; free cash flow margin > 15%; share of GICS subindustry revenues < 33%.

S&P 500 megacap outperformance

Performance of market-cap weighted - equal weighted S&P 500, %



Source: Bloomberg. January 15, 2021.

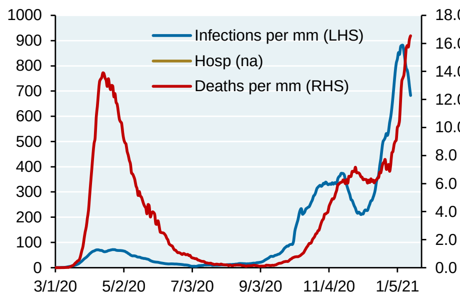
[2] **Senator John Sherman in 1890**: "If we will not endure a king as a political power we should not endure a king over the production, transportation and sale of any of the necessaries of life". Congress passed the Sherman Antitrust Act that same year.

[3] Reuters reports that **Parler** may be back online by the end of the month using an internet protocol address owned by a firm located in **Rostov-on-Don, Russia**

COVID, soaring: mutations, vaccines, adverse events and internet lies

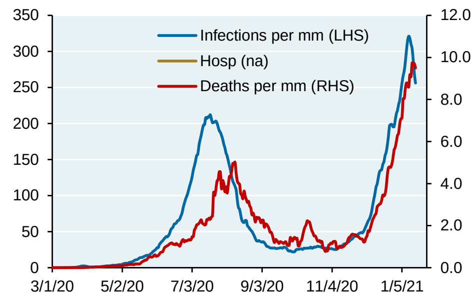
The COVID outlook right now is all about the collision of new mutations and the offsetting pace of vaccination. The UK, South Africa and Ireland experienced rapidly rising infections and mortality due to these new mutations. Remember: even if new mutations are not more *deadly*, they still result in more *deaths* if the infection mortality rate (deaths as a % of infected people) stays the same as infections rise.

United Kingdom daily infections vs mortality



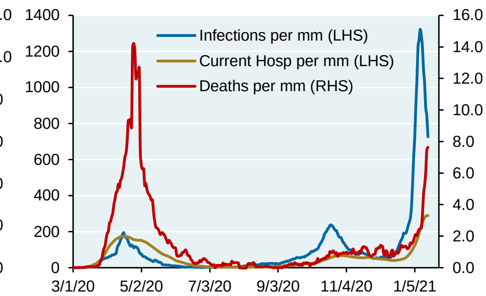
Source: JHU, JPMAM. 01/17/2021. 7 day avg.

South Africa daily infections vs mortality



Source: JHU, JPMAM. 01/17/2021. 7 day avg.

Ireland daily infections vs mortality



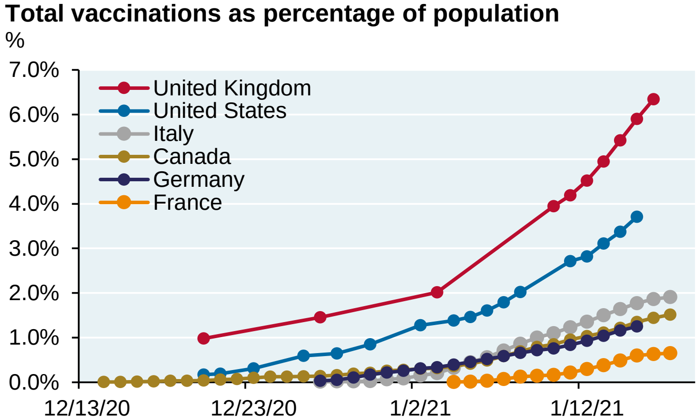
Source: JHU, ECDC, JPMAM. 01/17/2021. 7 day avg.

Will existing vaccines "work" against new mutations? Against some, yes; against others, we don't know yet. New research suggests that Pfizer's COVID-19 vaccine can protect against a mutation found in highly contagious variants that erupted in Britain and South Africa. Pfizer used blood samples from 20 people who received the vaccine, and their antibodies successfully fended off the new variant in vitro. But there are more mutations to test, one of which also originated in South Africa (E484 mutation). Testing is underway and if existing vaccines do not provide high levels of efficacy, new rounds of vaccine research, testing and production will be required.

Vaccinations are plodding along for the procedural and personnel bottlenecks you read about, and reluctance of healthcare workers to receive them. Indicative vaccine resistance levels, as per the NYT: Jackson Healthcare System in Miami 15%; Henry Ford Health System in Michigan 22%; nursing home staff in Ohio 60%; healthcare workers in NYC 30%. I have confidence in vector and mRNA vaccines but my preference is for recombinant protein vaccines that should be available later this year. See Section 3 on our web portal for more details.

The most aggravating internet COVID fallacy is that COVID deaths simply offset other causes of death[4]. Internet social media is of course a terrible place to go for information (although I have in-laws that do exactly this, on science, politics and law). Data from the CDC is **very clear: deaths from all causes have surged relative to normal levels, and the reason for that is COVID**. End of story.

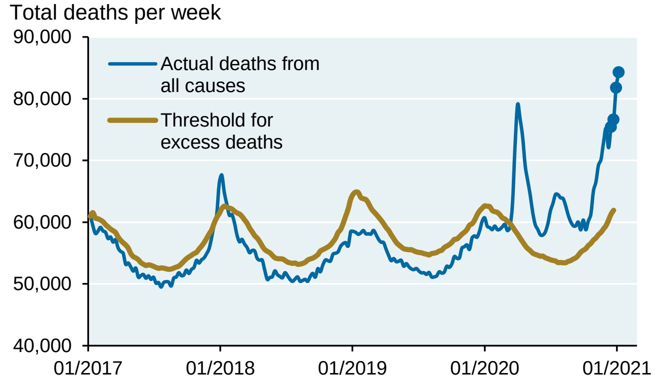
Total vaccinations as percentage of population



Source: OWID, JPMAM. January 18, 2021.

Tracking excess deaths from COVID

Total deaths per week



Source: CDC, JHU, JPMAM. January 16, 2021. Dots are estimated using most recent JHU data.

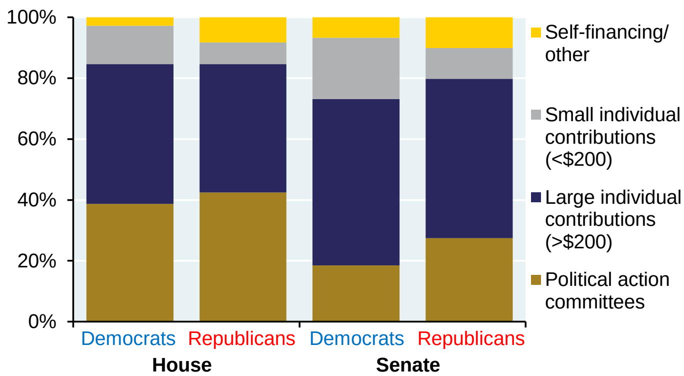
[4] I had an unpleasant exchange a few months ago with someone who kept insisting this; he has not contacted me since.

DC insurrection: The Fly, and corporate PAC funding for Congressional objectors

Do you remember the fly that landed on Mike Pence's head during the VP debate? I think that fly was trying to **warn Pence** that Trump was going to betray him in the most Shakespearean manner imaginable: by ascribing to him the awesome power of effectively determining the election outcome via his role presiding over the Joint Session. One example, from Trump at 1 am on Jan 6: "If Mike Pence comes through for us, we will win the Presidency". Pence of course had *none* of these powers, even under the most distorted and charitable readings of the Electoral Count Act and the 12th Amendment; we explained all of that in our Jan 1st note on Joint Session rules. But enough people believed it, particularly after Trump expressed his anger at Pence for betraying him[5].

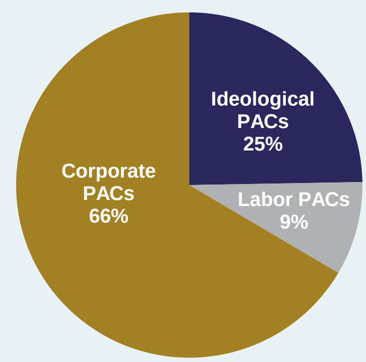
So, here we are the day before the inauguration and a number of US companies announced that they will **cease making political donations to members of Congress** who objected on Jan 6th to the Electoral College results, and who requested a 10-day election audit that was almost certainly procedurally impossible[6]. For context, here's a look at political funding sources in the House and Senate. Political Action Committees (PACs) represent 20%-40% of Congressional funding, and 2/3 of that amount is **corporate PACs**[7].

Political funding sources
Average of 2014, 2016 & 2018 election cycles by chamber and party



Source: Center for Responsive Politics, JPMAM. 2020.

Congressional candidate funding by type of PAC, % of total PAC funding received by top 50 recipients in 2020 election



Source: Center for Responsive Politics, JPMAM. 2020.

Which politicians generally receive corporate PAC donations?

A colleague of mine suggested that corporate PAC donations are usually skewed towards the moderates. **We took a look at some actual data, and this is only partially true**. The first chart on page 6 superimposes corporate PAC donations on Senators as a function of their conservatism/ liberalism. Corporate PAC donations to GOP Senators more or less match up against where these Senators are ideologically, so there's no preference for moderates that we can see. However, **corporate PAC donations to Democrats are skewed to slightly more centrist Senators**, and there's also almost no funding for the most progressive Democratic Senators.

---

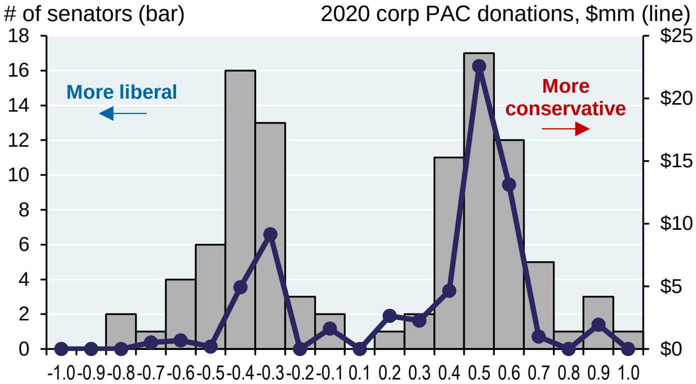
[5] See https://reason.com/2021/01/06/trump-tweets-about-mike-pences-betrayal-while-his-supporters-force-the-v-p-to-evacuate-the-capitol/

[6] Our constitutional law advisor Michael Morley: **once Congress begins counting electoral votes, there are procedural barriers that make it difficult/impossible for Congress to stop to create an electoral commission along the lines Cruz suggested**. Congress is barred from adjourning the joint session to pass a resolution or law creating a new electoral commission, unless it were willing to declare the Electoral Count Act unconstitutional and act directly contrary to its provisions. Other sections of the ECA confirm that the joint session is unable to vote on anything other than a motion to withdraw to separate chambers to vote on electoral slate objections.

[7] This dataset excludes **SuperPACs** which are prohibited from contributing directly to candidates. SuperPACs exploded in size since 2010; donations by Democrats and Republicans have been split ~50/50 since 2014. In 2020, $2 billion in SuperPAC spending was 55% Conservative and 45% Liberal. Twenty five mega-donors account for half of all individual donations to SuperPACs. Sources: Public Citizen, Center for Responsible Politics.

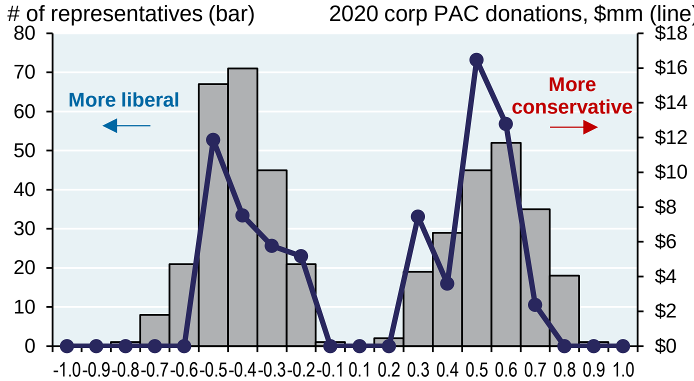
In the House, corporate PAC donations to both parties mostly match up against where the Representatives are politically. However, there's some evidence (as in the Senate) that the most liberal and most conservative Representatives do not receive much corporate PAC funding.

Senator political ideology vs corporate PAC funding



Source: VoteView Roll Call Votes database derived from Congr. voting histories, Center for Responsive Politics, JPMAM. 2020.

House Rep political ideology vs corporate PAC funding



Source: VoteView Roll Call Votes database derived from Congr. voting histories, Center for Responsive Politics, JPMAM. 2020.

What would I do regarding PAC funding for Congressional objectors? To be clear, my opinion is my own and plays no role in anything except writing this piece. Here's how I see it.

Arguments to cease donations. It's hard to find reasonable, good-faith reasons for the objections. There were no competing slates on the floor (some competing slates were reportedly submitted to the National Archives but Pence chose *not* to submit them to Congress). In other words, even though 5 of 6 "disputed" states are controlled by GOP legislatures, NONE of them officially submitted a competing slate. Furthermore, after dozens of Court cases, no judge or group of judges at any level ruled that officially certified Biden slates should be in any way discounted or decertified. As a result, the Jan 6th objections were attempts to disenfranchise voters without good reason and were not in accordance with the objectives and principles of the company's PAC; as such, the PAC should be retargeted to politicians who share the values of the firm.

Arguments NOT to cease donations. Irrespective of their reasoning, Congressional objectors were adhering to rights ascribed to them in the Electoral Count Act, a bill passed in 1887 for the express purpose of avoiding more violent and disruptive means of resolving Electoral College disputes. If companies punish objectors who use legal means, that creates incentives for objectors to use extralegal means next time. Democratic House Reps raised objections at the Joint Session in 2004 on Ohio, and tried to raise objections in both 2000 and 2016 but House Reps could not find a Democratic Senator to support them. Whatever their motives, those objectors should not have been sanctioned either. Here's how the process should work: objectors should state their reasons for doing so, and supporters of officially certified slates should denounce such objections (such as those raised by Hawley and Cruz) for being cynical, unsupported and baseless reversals of the will of the voters, using data, court opinions and legal precedent in doing so. That's how politics is supposed to work.

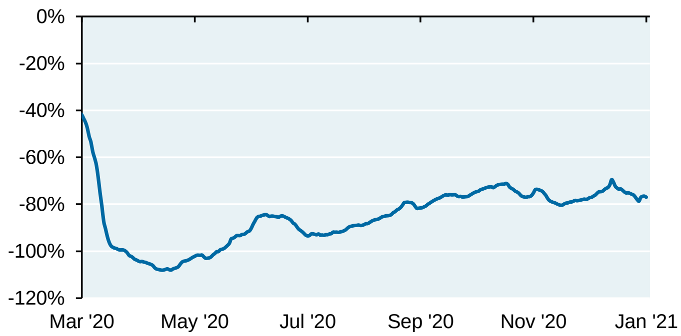
All things considered, I would not cut off funding to Congressional objectors solely based on their Jan 6th decision. I would align corporate PACs with politicians who share the firm's values over a wide range of issues, including bills that support protection of voting rights[8]. However, while I would not cut off PAC funding based on that decision alone, I understand the rationale of companies who did.

[8] Democrats in Congress tried last year to amend parts of the **Voting Rights Act** that were deemed unconstitutional by the Supreme Court in 2013 due to use of substantially outdated formulas for determining which jurisdictions need advance DoJ or Federal Court approval to change election-related rules. Voting rights legislation that is updated to reflect changing minority voter registration and participation *and* which is likely to survive Supreme Court challenges would be the most practical and effective way to prevent voter suppression.

There's still a fear of flying, but oil demand and oil stocks have rebounded

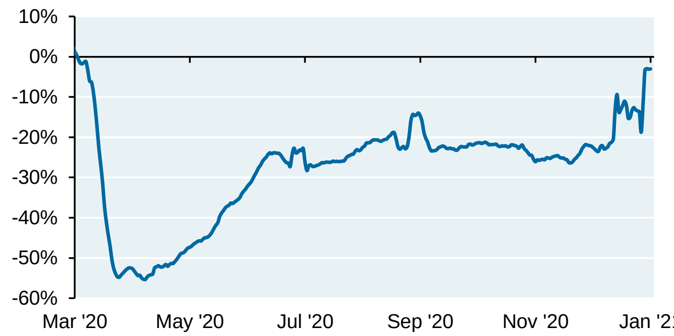
Airline spending is still moribund but oil demand is rising sharply both in the US and elsewhere. In our 2020 Annual Energy piece last June, we outlined the reasons why we expected a rebound in oil and gas stocks and related service sector businesses. **We believe that the loss of capital discipline by investors and oil & gas companies, rather than stranded asset risks and renewable energy penetration, were the primary drivers of poor energy sector performance from 2017-2020**. The pace of renewable energy adoption, particularly for primary energy consumption unrelated to electricity, is simply too slow to explain that poor performance. Capital discipline has unsurprisingly returned to the energy sector, as it usually does after people lose a lot of money. One last point: we consider it unlikely that Biden will try in 2021 or 2022 to resuscitate the Iran deal, which if reinstated could release another 1mm bpd onto the global oil market.

National credit and debit card spending trends
AIRLINE spending, all transcations
Spending change vs 2019, 7 day smoothing



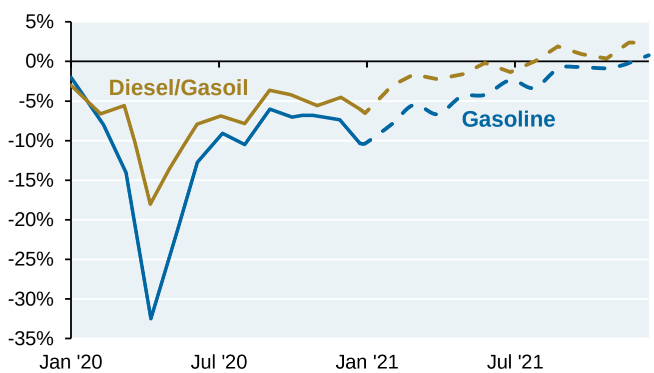
Source: Internal Chase data, JPMAM. January 11, 2021.

National credit and debit card spending trends
OIL spending, all transcations
Spending change vs 2019, 7 day smoothing



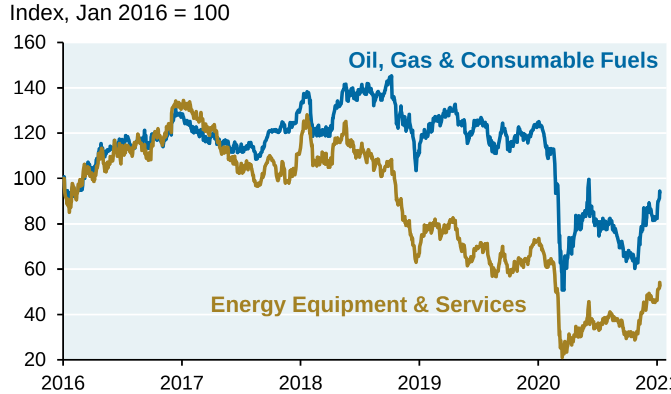
Source: Internal Chase data, JPMAM. January 11, 2021.

Global gasoline and diesel demand
Percent change vs 2019



Source: J.P. Morgan Global Commodities Research. January 13, 2021.

S&P 500 energy industry total returns
Index, Jan 2016 = 100



Source: Bloomberg. January 13, 2021.

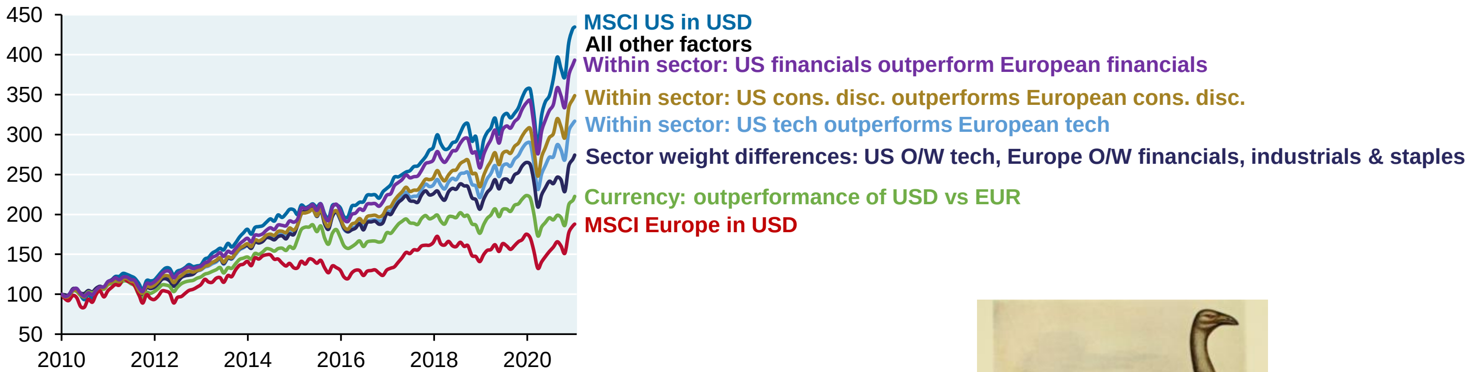
The flightless moa: European equities

What can explain the flightless moa that is European equities? Since 2010, European equities generated cumulative returns of 88% while US equities cumulative returns were 335%. The next chart dissects European equity underperformance into its component pieces by using a "build" approach:

- outperformance of the dollar vs the Euro
- the higher weighting in the US to tech vs financials/industrial/staples (sector outperformance)
- US outperformance vs Europe WITHIN sectors such as tech, consumer discretionary and financials (stock-specific outperformance)

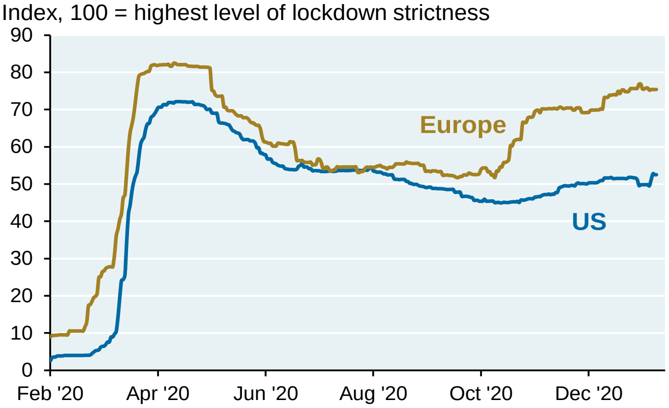
Bottom line: US outperformance vs Europe is a function of all of these things, with the **largest attribution due to stock-specific outperformance within sectors**. While I can imagine that the currency tailwind for the dollar won't last forever, other factors may be more durable over the long term as we discussed in the Outlook (i.e., higher ROE/ROA for US firms vs European counterparts). We expect 2021 to be a better year in *absolute* terms for Europe once its economy, which is highly geared to global trade, reopens.

US vs Europe performance
Total return, Jan 2010 = 100



Source: Bloomberg. January 15, 2021.

Lockdown stringency index: US vs Europe
Index, 100 = highest level of lockdown strictness



Source: University of Oxford, JPMAM. January 14, 2021.

The flightless extinct moa

IMPORTANT INFORMATION

This report uses rigorous security protocols for selected data sourced from Chase credit and debit card transactions to ensure all information is kept confidential and secure. All selected data is highly aggregated and all unique identifiable information, including names, account numbers, addresses, dates of birth, and Social Security Numbers, is removed from the data before the report's author receives it. The data in this report is not representative of Chase's overall credit and debit cardholder population.

The views, opinions and estimates expressed herein constitute Michael Cembalest's judgment based on current market conditions and are subject to change without notice. Information herein may differ from those expressed by other areas of J.P. Morgan. This information in no way constitutes J.P. Morgan Research and should not be treated as such.

The views contained herein are not to be taken as advice or a recommendation to buy or sell any investment in any jurisdiction, nor is it a commitment from J.P. Morgan or any of its subsidiaries to participate in any of the transactions mentioned herein. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit and accounting implications and determine, together with their own professional advisers, if any investment mentioned herein is believed to be suitable to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yields are not reliable indicators of current and future results.

Non-affiliated entities mentioned are for informational purposes only and should not be construed as an endorsement or sponsorship of J.P. Morgan Chase & Co. or its affiliates.

For J.P. Morgan Asset Management Clients:

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.
To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our privacy policies at https://am.jpmorgan.com/global/privacy.

ACCESSIBILITY

For U.S. only: If you are a person with a disability and need additional support in viewing the material, please call us at 1-800-343-1113 for assistance.
This communication is issued by the following entities:
In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients' use only, by local J.P. Morgan entities, as the case may be.; in Canada, for institutional clients' use only, by JPMorgan Asset Management (Canada) Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. In the United Kingdom, by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions, by JPMorgan Asset Management (Europe) S.à r.l. In Asia Pacific ("APAC"), by the following issuing entities and in the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), which this advertisement or publication has not been reviewed by the Monetary Authority of Singapore; JPMorgan Asset Management (Taiwan) Limited; JPMorgan Asset Management (Japan) Limited, which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number "Kanto Local Finance Bureau (Financial Instruments Firm) No. 330"); in Australia, to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919). For all other markets in APAC, to intended recipients only.

For J.P. Morgan Private Bank Clients:

ACCESSIBILITY

J.P. Morgan is committed to making our products and services accessible to meet the financial services needs of all our clients. Please direct any accessibility issues to the Private Bank Client Service Center at 1-866-265-1727.

LEGAL ENTITY, BRAND & REGULATORY INFORMATION

In the **United States**, bank deposit accounts and related services, such as checking, savings and bank lending, are offered by JPMorgan Chase Bank, N.A. Member FDIC.
JPMorgan Chase Bank, N.A. and its affiliates (collectively **"JPMCB"**) offer investment products, which may include bank-managed investment accounts and custody, as part of its trust and fiduciary services. Other investment products and services, such as brokerage and advisory accounts, are offered through **J.P. Morgan Securities LLC ("JPMS")**, a member of FINRA and SIPC. JPMCB and JPMS are affiliated companies under the common control of JPM. Products not available in all states.
In **Luxembourg**, this material is issued by **J.P. Morgan Bank Luxembourg S.A. (JPMBL)**, with registered office at European Bank and Business Centre, 6 route de Treves, L-2633, Senningerberg, Luxembourg. R.C.S Luxembourg B10.958. Authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg S.A. is authorized as a credit institution in accordance with the Law of 5th April 1993. In the **United Kingdom**, this material is issued by **J.P. Morgan Bank Luxembourg S.A., London Branch**, registered office at 25 Bank Street, Canary Wharf, London E14 5JP. Authorised and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. Deemed authorised by the Prudential Regulation Authority. Subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details of the Temporary Permissions Regime, which allows EEA-based firms to operate in the UK for a limited period while seeking full authorisation, are available on the Financial Conduct Authority's website.

In **Spain**, this material is distributed by **J.P. Morgan Bank Luxembourg S.A., Sucursal en España**, with registered office at Paseo de la Castellana, 31, 28046 Madrid, Spain. J.P. Morgan Bank Luxembourg S.A., Sucursal en España is registered under number 1516 within the administrative registry of the Bank of Spain and supervised by the Spanish Securities Market Commission (CNMV). In **Germany**, this material is distributed by **J.P. Morgan Bank Luxembourg S.A., Frankfurt Branch**, registered office at Taunustor 1 (TaunusTurm), 60310 Frankfurt, Germany, jointly supervised by the Commission de Surveillance du Secteur Financier (CSSF) and the European Central Bank (ECB), and in certain areas also supervised by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). In **Italy**, this material is distributed by **J.P. Morgan Bank Luxembourg S.A., Milan Branch**, registered office at Via Catena Adalberto 4, Milan 20121, Italy
and regulated by Bank of Italy and the Commissione Nazionale per le Società e la Borsa (CONSOB). In the **Netherlands**, this material is distributed by J**.P. Morgan Bank Luxembourg S.A., Amsterdam**
Branch, with registered office at World Trade Centre, Tower B, Strawinskylaan 1135, 1077 XX, Amsterdam, The Netherlands. J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is authorized and regulated by the Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF in Luxembourg; J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is also authorized and supervised by De Nederlandsche Bank (DNB) and the Autoriteit Financiële Markten (AFM) in the Netherlands. Registered with the Kamer van Koophandel as a branch of J.P. Morgan Bank Luxembourg S.A. under registration number 71651845. In **Denmark**, this material is distributed by **J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A.** with registered office at Kalvebod Brygge 39-41, 1560 København V, Denmark. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is also subject to the supervision of Finanstilsynet (Danish FSA) and registered with Finanstilsynet as a branch of J.P. Morgan Bank Luxembourg S.A. under code 29009. In **Sweden**, this material is distributed by **J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfilial**, with registered office at Hamngatan 15, Stockholm, 11147, Sweden. J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfilial is authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfilial is also subject to the supervision of Finansinspektionen (Swedish FSA). Registered with Finansinspektionen as a branch of J.P. Morgan Bank Luxembourg S.A. In **France**, this material is distributed by **JPMorgan Chase Bank, N.A. ("JPMCB"), Paris branch**, which is regulated by the French banking authorities Autorité de Contrôle Prudentiel et de Résolution and Autorité des Marchés Financiers. In **Switzerland**, this material is distributed by **J.P. Morgan (Suisse) SA**, which is regulated in Switzerland by the Swiss Financial Market Supervisory Authority (FINMA).
In **Hong Kong**, this material is distributed by **JPMCB, Hong Kong branch**. JPMCB, Hong Kong branch is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission of Hong Kong. In Hong Kong, we will cease to use your personal data for our marketing purposes without charge if you so request. In **Singapore**, this material is distributed by **JPMCB, Singapore branch**. JPMCB, Singapore branch is regulated by the Monetary Authority of Singapore. Dealing and advisory services and discretionary investment management services are provided to you by JPMCB, Hong Kong/Singapore branch (as notified to you). Banking and custody services are provided to you by JPMCB Singapore Branch. The contents of this document have not been reviewed by any regulatory authority in Hong Kong, Singapore or any other jurisdictions. You are advised to exercise caution in relation to this document. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice. For materials which constitute product advertisement under the Securities and Futures Act and the Financial Advisers Act, this advertisement has not been reviewed by the Monetary Authority of Singapore. JPMorgan Chase Bank, N.A. is a national banking association chartered under the laws of the United States, and as a body corporate, its shareholder's liability is limited.
With respect to countries in **Latin America**, the distribution of this material may be restricted in certain jurisdictions. We may offer and/or sell to you securities or other financial instruments which may not be registered under, and are not the subject of a public offering under, the securities or other financial regulatory laws of your home country. Such securities or instruments are offered and/or sold to you on a private basis only. Any communication by us to you regarding such securities or instruments, including without limitation the delivery of a prospectus, term sheet or other offering document, is not intended by us as an offer to sell or a solicitation of an offer to buy any securities or instruments in any jurisdiction in which such an offer or a solicitation is unlawful. Furthermore, such securities or instruments may be subject to certain regulatory and/or contractual restrictions on subsequent transfer by you, and you are solely responsible for ascertaining and complying with such restrictions. To the extent this content makes reference to a fund, the Fund may not be publicly offered in any Latin American country, without previous registration of such fund's securities in compliance with the laws of the corresponding jurisdiction. Public offering of any security, including the shares of the Fund, without previous registration at Brazilian Securities and Exchange Commission— CVM is completely prohibited. Some products or services contained in the materials might not be currently provided by the Brazilian and Mexican platforms.
JPMorgan Chase Bank, N.A. (JPMCBNA) (ABN 43 074 112 011/AFS Licence No: 238367) is regulated by the Australian Securities and Investment Commission and the Australian Prudential Regulation
Authority. Material provided by JPMCBNA in Australia is to "wholesale clients" only. For the purposes of this paragraph the term "wholesale client" has the meaning given in section 761G of the Corporations Act 2001 (Cth). Please inform us if you are not a Wholesale Client now or if you cease to be a Wholesale Client at any time in the future.

JPMS is a registered foreign company (overseas) (ARBN 109293610) incorporated in Delaware, U.S.A. Under Australian financial services licensing requirements, carrying on a financial services business in Australia requires a financial service provider, such as J.P. Morgan Securities LLC (JPMS), to hold an Australian Financial Services Licence (AFSL), unless an exemption applies. J**PMS is exempt from the requirement to hold an AFSL under the Corporations Act 2001 (Cth) (Act) in respect of financial services it provides to you, and is regulated by the SEC, FINRA and CFTC under U.S. laws, which differ from Australian laws.** Material provided by JPMS in Australia is to "wholesale clients" only. The information provided in this material is not intended to be, and must not be, distributed or passed on, directly or indirectly, to any other class of persons in Australia. For the purposes of this paragraph the term "wholesale client" has the meaning given in section 761G of the Act. Please inform us immediately if you are not a Wholesale Client now or if you cease to be a Wholesale Client at any time in the future.
This material has not been prepared specifically for Australian investors. It:
• May contain references to dollar amounts which are not Australian dollars;
• May contain financial information which is not prepared in accordance with Australian law or practices;
• May not address risks associated with investment in foreign currency denominated investments; and
• Does not address Australian tax issues.
References to "J.P. Morgan" are to JPM, its subsidiaries and affiliates worldwide. "J.P. Morgan Private Bank" is the brand name for the private banking business conducted by JPM. This material is intended for your personal use and should not be circulated to or used by any other person, or duplicated for non-personal use, without our permission. If you have any questions or no longer wish to receive these communications, please contact your J.P. Morgan team.