

January 5, 2021 02:01 AM GMT

## Global Macro Briefing | Global

# Don't Underestimate Inflation's Upside Risks

Inflation will be a key debate for 2021. We have increased confidence in our out-of-consensus call, made since May-20, that US core PCE inflation will overshoot 2% in this cycle. We believe the key difference between us and consensus is the assumption around strength of private sector risk appetite.

**Inflation – our key out-of-consensus call:** Our views on inflation, as on growth, are more bullish than the consensus. Since 3rd April 2020, we have argued that a V-shaped recovery in growth would unfold and in May 2020, we warned that inflation will make a return in this cycle. Since then, our conviction has only increased. Our GDP growth forecast of 5.9%Y for the US in 2021 is significantly above consensus estimates at 3.9%Y. We see US core PCE inflation ending the year at 2%Y and staying above 2% on a sustained basis from 2022. In contrast, the consensus sees it reaching 2% over a longer timeframe and is skeptical that inflation will exceed 2% for a sustained period.

**Why we differ from consensus:** Many pillars support our stance on inflation, but in this report, we delve deeper into where we diverge from the consensus view. We believe our assessment of private sector risk appetite is the key difference. With limited scarring thanks to a sharper but shorter cycle and with income losses underwritten by policy support, we have seen limited signs of stress in household and corporate balance sheets. Demand should therefore rebound sharply once restrictions on mobility and spending opportunities are lifted. The stronger growth outcome we expect also means that unemployment rates will decline faster than the consensus expects. Moreover, since job losses are concentrated in the lower income segments, the headline unemployment rate overstates the economic loss. Finally, accelerated restructuring would mean higher NAIRU in the near term.

**What are the risks to our inflation outlook?** In the near term, the virus outbreak and vaccine rollout remains a risk to both the growth and inflation outlook. Beyond that, we see two risks to our base case. First, as we enter the second half of the year, the acceleration in the recovery could lead to a quicker and more intense rise in wage and price pressures. Inflation could accelerate even faster, un-anchoring inflation expectations to the upside and bringing a shift in expectations on Fed policy, with attendant volatility in financial markets. Second, in our base case we see the sharp pickup in demand outweighing any potential expansion on the supply side. If factor markets prove to be more flexible than thought, especially on the labor side, inflationary pressures can be kept at bay. However, in this scenario, the risks of asset bubbles could emerge, weighing on financial stability.

MORGAN STANLEY &amp; CO. LLC

**Chetan Ahya**

CHIEF ECONOMIST AND GLOBAL HEAD OF ECONOMICS

Chetan.Ahya@morganstanley.com +1 212 761-6730

**Derrick Y Kam**

ECONOMIST

Derrick.Kam@morganstanley.com +1 212 761-9260

MORGAN STANLEY &amp; CO. INTERNATIONAL PLC

**Nora Wassermann**

ECONOMIST

Nora.Wassermann@morganstanley.com +41 44 588-1050

MORGAN STANLEY &amp; CO. LLC

**Julian M Richers**

ECONOMIST

Julian.Richers@morganstanley.com +1 212 761-2305

**Frank Zhao**

ECONOMIST

Frank.Zhao@morganstanley.com +1 212 761-1909

**Exhibit 1: US core PCE inflation to reach 2% by end 2021, rise sustainably above 2% in 2022**



Source: BEA, Haver Analytics, Morgan Stanley Research forecasts

## Recent Global Macro Research

[2021 Global Macro Outlook: The Next Phase of the V](#)

[Global Macro Briefing: Our Pushback to Your Pushback](#)

[EM Economics Playbook: The Next Phase of the EM Reflation Story](#)

For important disclosures, refer to the Disclosure Section, located at the end of this report.

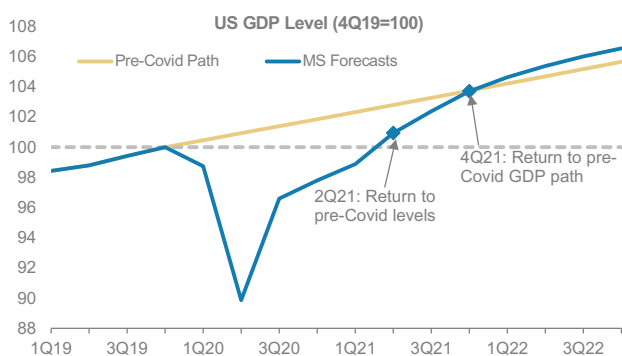
# Don't Underestimate Inflation's Upside Risks

**The inflation debate intensifies:** The debates around the macro outlook tend to follow a similar pattern in recessions. As the downturn hits, the debate centers on the growth path and when the economy will reach pre-recession output levels. As it becomes clearer that the shock is receding and the economy is making progress, the debate shifts to whether and when inflation will reach the central bank's target. This time has been no different. We are seeing signs that the inflation debate is heating up, judging by the increasing number of incoming questions around our inflation call and commentary in the traditional financial press arguing for and against inflation.

**Our out-of-consensus call – a modest inflation overshoot inflation in 2022:** Our Chief US Economist Ellen Zentner forecasts that core PCE inflation in the US will rise to 2.0% in December 2021 and will moderately overshoot in 2022, staying in the range of 2.2% for most of 2022. Both these calls are out of consensus. While the consensus no longer sees a deep disinflationary shock due to Covid-19, they have inflation reaching 2% over a longer timeframe and remain skeptical that it will cross 2% on a sustained basis.

In contrast, a quick recovery in GDP to pre-Covid levels by 2Q21 and its pre-Covid path (where GDP would have been absent the shock) by 4Q21 will also mean a faster decline in the unemployment rate, ending 2021 at 5.1%. Even against this backdrop, policies will remain highly reflationary, setting the stage for a further rise in inflation in 2022. We see the re-emergence of inflation as posing a new threat to the business cycle, and expansions could also be shorter.

**Exhibit 2:** US GDP to return to its pre-Covid levels by 2Q21 and to return to its pre-Covid path by 4Q21



Source: BEA, Haver Analytics, Morgan Stanley Research forecasts.

**Exhibit 3:** US core PCE inflation to reach 2% by end 2021, rise sustainably above 2% in 2022



Source: BEA, Haver Analytics, Morgan Stanley Research forecasts

## Why do we differ from the consensus view on inflation?

**This cycle is different:** Since May 2020, our view has been that the Great Covid-19 Recession (GCR) has unleashed forces that will fundamentally alter inflation dynamics. We see the return of inflation in this cycle after a 30-year absence. For more details, see [Global Economics: The Return of Inflation \(11 May 2020\)](#) and [Global Macro Briefing: A Stronger Case for the Return of Inflation \(17 Aug 2020\)](#) In this report, we focus on the

key differences between our view and the consensus. We think the crux of the matter is that consensus views this cycle through the lens of previous cycles and underestimates the potential for inflation to stage a comeback. In particular, the consensus is more skeptical about the pace of the recovery and overestimates the impact of unemployment on inflation.

#### Five reasons why we expect an inflation overshoot:

##### 1) Limited scarring due to a sharper but shorter cycle

Private sector risk appetite is largely intact, and public sector support is robust: A key difference in this cycle is that it resulted from an exogenous shock. This distinction matters because of how it has shaped both policy and private sector responses. Policy makers did not hesitate to provide significant support as moral hazard concerns were limited (in sharp contrast to an endogenous business cycle, where misallocation could have occurred). In turn, the damage to private sector risk appetite has been less severe than most feared and continue to assume.

##### a) The government and central bank has underwritten household and corporate income losses in an unprecedented manner:

**Household incomes increased even as output declined:** Another unique feature of the GCR has been the divergence between household income and overall economic output. While GDP collapsed, taking household wage compensation down with it, overall household income actually increased, thanks to the timely fiscal policy response. After a brief dip in March, total income has risen substantially above pre-Covid levels and has remained there, reflecting the scale of fiscal transfer programs. A divergence of this magnitude between income and output in a recession is virtually without precedent.

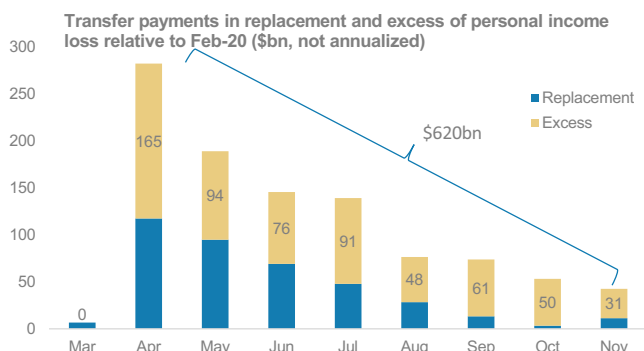
**Transfers have more than made up for income losses:** The surprising positive turn in household income reflects the fact that aggregate fiscal transfers were substantially larger than the economic losses that households incurred. Due to the lump-sum structure of supplemental unemployment payments, researchers at the University of Chicago estimate that two-thirds of all unemployed received more in unemployment compensation than they had previously earned while on the job, with the median earnings replacement rate at 134% during the first phase of the pandemic (including stimulus checks and other payments).

In aggregate, transfers to households through November have already exceeded income losses relative to pre-pandemic levels by \$620bn. The next round of stimulus checks is on track to add another \$110bn to excess savings, even assuming that households have an initial marginal propensity to consume of 33% (in line with the first round of checks in April). Extended and augmented unemployment insurance payments will likely convert into spending more fully, but any savings here would raise the total amount further. While the case is clear that income losses should be replaced by transfers due to the unique nature of this recession, the issue is that these transfers have more than done the job and could ultimately fuel a pickup in inflationary pressures.

**Despite dispersion, households are on a strong footing:** While segments of the population continue to face economic hardship and will require continued fiscal support, transfers have generally been effective in reaching low- and middle income households.

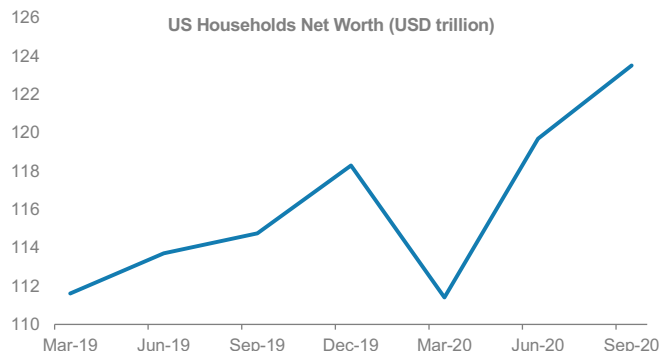
These households also tend to have a high marginal propensity to consume, which is reflected in consumer spending data (discussed above). Household net worth has increased by \$5.2trn since the end of 2019 while consumer credit liabilities have fallen. US consumers therefore do not face major roadblocks to ramping up spending, in stark contrast to the strong deleveraging pressures after the global financial crisis (GFC).

**Exhibit 4:** US government transfers to households through Nov-20 have exceeded income losses relative to pre-Covid levels by \$620bn



Source: BEA, Haver Analytics, Morgan Stanley Research

**Exhibit 5:** US household net worth has increased by \$5.2 trillion since the end of 2019



Source: Fed, Haver Analytics, Morgan Stanley Research

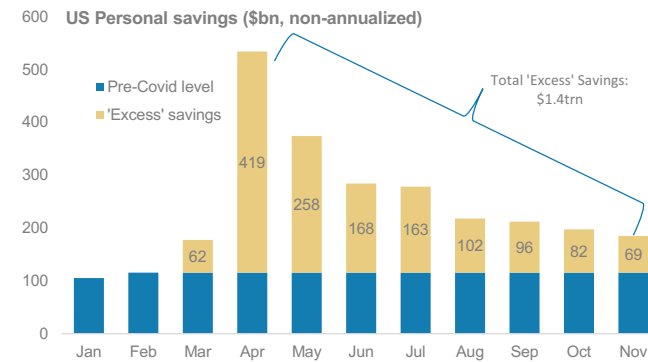
**b) Limited signs of stress in corporate and household balance sheets:** Heading into the recession, the US private sector (i.e. both corporates and households) was less indebted compared to previous recessions. Private sector debt-to-GDP had been stable and there were no clear signs of excessive leverage or undue risk-seeking behaviors, such as overinvestment by the corporate sector in aggregate.

As a consequence, we believe that the impact to private sector risk appetite is much more limited than commonly thought. Typical measures of stress such as corporate credit spreads or household delinquencies have either normalized very quickly or have not been notably impaired.

**Spending cuts are not a sign of risk aversion:** The consensus believes that elevated household saving is a reflection of caution around personal finances. The US household saving rate remains elevated at 12.9% in Nov-20 vs. the pre-recession level of 8.3% in Feb-20. In aggregate, US households currently hold US\$1.4T (as of November) of excess saving, which is equivalent to 9.8% of 2019 annual personal consumption expenditures, a figure that will undoubtedly be boosted by the passage of the latest relief package. The consensus view is that caution is likely to prevail, household saving will remain somewhat elevated, and this will hold back the recovery in consumer spending, acting as a drag on aggregate demand and hence inflation. Moreover, capacity utilization and investments in select consumer and service sectors have pulled back in 2020, which in light of the sharp rebound in demand we expect in 2021, implies a significant demand-supply mismatch in these segments in 2022.

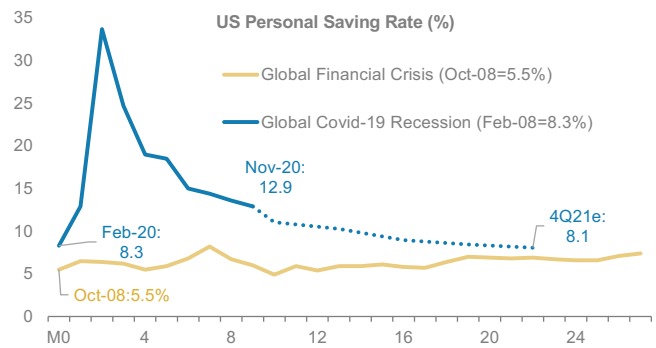
**But we see a drawdown to more normal levels:** We view this excess saving differently, seeing it as a buffer that will be drawn down as economies reopen. Our US economics team forecasts that the US household saving rate will decline to 8.1% by 4Q21, more in line with pre-Covid levels.

**Exhibit 6: US households currently hold \$1.4trn excess saving**



Source: BEA, Haver Analytics, Morgan Stanley Research

**Exhibit 7: US personal saving rate still elevated, but we expect a drawdown over the course of 2021**



Source: BEA, Haver Analytics, Morgan Stanley Research forecasts

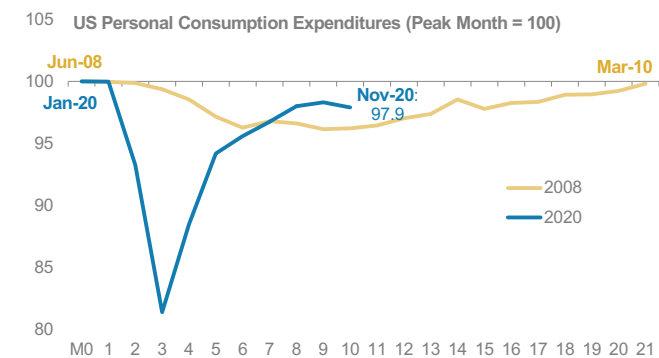
**Current consumption patterns reflect the impact of mobility restrictions, rather than caution on the part of households:** In our view, the current high level of saving can be attributed more to restrictions limiting spending opportunities than household cautiousness. Lacking granularity in the saving data, we glean clues on household behavior from consumption data in recent months. US personal consumption expenditures have already reached 97.9% of pre-Covid levels in Nov-20, which is telling in itself, demonstrating that consumers have not been reluctant to open their wallets and spend.

**Unsurprisingly, Covid-sensitive sectors have borne the brunt:** A look at the breakdown reveals that spending on goods has reached 106.2% of pre-Covid outlays, while spending on services is lagging somewhat at 94.2% of its pre-Covid level. This divergence in spending patterns in our view is due more to restrictions impacting spending on services, especially in Covid-sensitive sectors (i.e. those which are suffering most from restrictions, including tourism and indoor dining). Indeed, the categories in which consumer spending has been lagging are the Recreation, Transportation, and Accommodation and Food Services segments, which are more Covid-sensitive.

Moreover, the accelerated spending on goods has been more concentrated in durables. Taken together, these data points suggest to us that both the level of consumer spending and the breakdown of spending patterns do not reflect caution among households but rather the restrictions on mobility impacting consumer spending patterns.

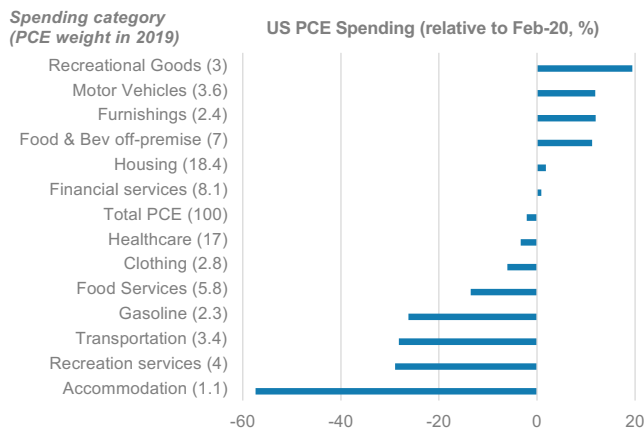
Similarly, high frequency datasets such as the one published by Harvard University Opportunity Insights allow us to look at spending patterns by zip codes. Spending in low-income zip codes is already back to pre-Covid levels, but still down in high-income areas. They too have concluded that spending has been held back more by restrictions than caution on the part of consumers.

**Exhibit 8:** US personal consumption expenditure has recovered to 97.9% of pre-Covid levels in Nov-20



Source: BEA, Haver Analytics, Morgan Stanley Research

**Exhibit 9:** US PCE in goods are already above pre-Covid levels while spending in Covid-sensitive service sector still lagging



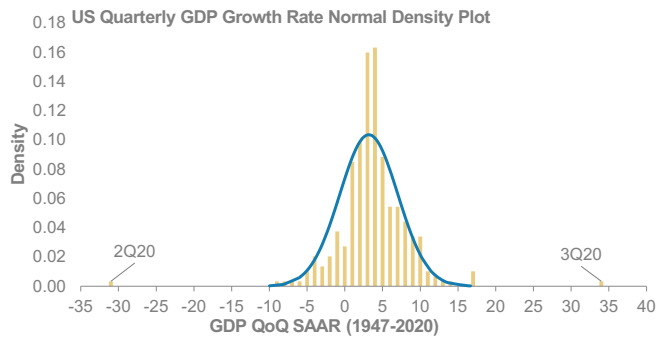
Source: BEA, Haver Analytics, Morgan Stanley Research

**Spending to rebound sharply from March / April:** These data points again reflect how different this recession has been. Looking ahead, as we expect economies to fully reopen in the spring when vaccines become more broadly available, we would expect a sharp rebound in demand, especially in Covid-sensitive sectors like travel and tourism. We expect to see this rebound from March / April next year and into the summer, as we believe that to lift restrictions, policy makers will need the vaccination of vulnerable sections of population and a corresponding reduction in hospitalizations and fatalities, rather than the higher bar of herd immunity.

**A sharp but short-lived recession:** While the economic shock was sharp, its duration was short as a record drop in quarterly output was followed by a record jump. Far-reaching shutdown measures implemented in March and April brought large swaths of economic activity to a standstill. US GDP dropped by more than 30%Q annualized, the largest shock to output on record and an 8 Sigma event. But activity quickly bounced back once restrictions were eased. The quick reversal of activity within two to three months after February's cycle peak should make this recession the shortest on record by a substantial margin. The average post-war recession has lasted for 11 months and the GFC contraction, for 18.

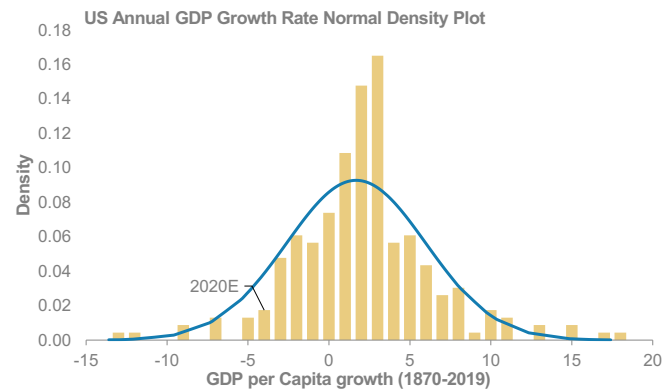
**While 2Q20 was an outlier, 2020 was not:** Due to the shortness of the contraction, the Great Covid-19 Recession's effect on annual GDP has also been much smaller than the magnitude of the initial shock would indicate. At -3.5%Y (expected), the GCR will still mark a substantial decline. But against a longer history of annual GDP growth figures, 2020 is not quite an outlier. As Exhibit 11 shows, it falls neatly into a roughly normal distribution of growth outcomes over the last 150 years. 2020 pales in comparison with years like 1930-1932, the depths of the Great Depression, where GDP fell by close to 10% for three years consecutively. The recovery since May has also occurred at a lightning pace. As of 4Q20, we estimate that US private final domestic demand had already reached 99% of pre-Covid levels.

**Exhibit 10:** While the 2Q20 contraction in the US GDP was an outlier...



Source: BEA, Haver Analytics, Morgan Stanley Research

**Exhibit 11:** ... the growth in full year 2020 was not



Source: BEA, Haver Analytics, Morgan Stanley Research

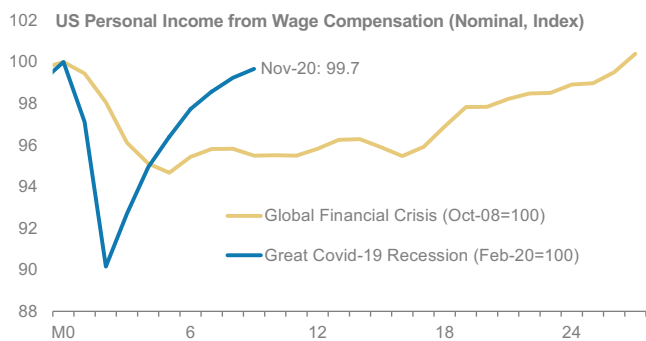
## 2) The unemployment rate overstates the economic loss

**Sharper decline in unemployment:** Our 2021 GDP growth forecasts are more bullish than the consensus by 2 percentage points and consistent with that constructive view, we are projecting a sharper decline in the unemployment rate than the consensus. We expect unemployment to end the year at 5.1%, vs consensus expectations of 5.5%.

**Job losses have been concentrated in low-income segments:** Moreover, we believe that the unemployment rate overstates the economic loss. While US GDP is rapidly making up lost ground and approaching pre-Covid levels, unemployment remains substantially above its prior lows. This divergence reflects the fact this recession has been a distinctly low-income recession. At the peak of the pandemic, 68% of all lost jobs were in low-wage industries. In contrast, the global financial crisis was effectively a middle-class recession, with middle-income jobs accounting for 50% of all job losses. About 77% of the job losses to date are also concentrated in sectors which are covid-sensitive and hence they should see a rebound in labor market activity as economies reopen.

**Wage income has almost fully recovered:** Given that the GCR unemployed skew largely low-income, the impact of an elevated unemployment rate on output and wage income is significantly weaker than past relationships would have predicted. Nominal personal income from wage compensation has already reached 99.7% of pre-Covid levels in November, while it took 27 months to return to pre-crisis levels after the GFC.

**Exhibit 12:** US nominal personal income from wage compensation already reached 99.7% of pre-Covid levels in November



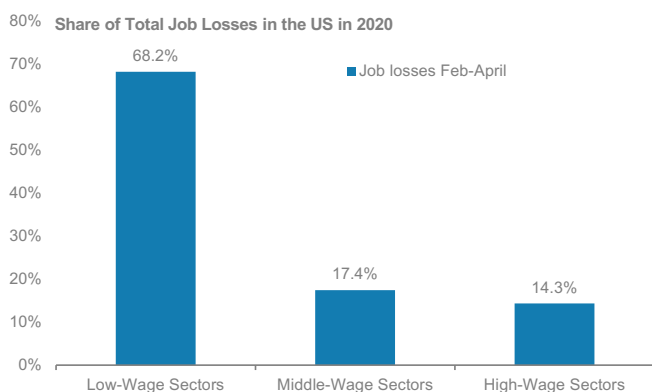
Source: BEA, Haver Analytics, Morgan Stanley Research

**Exhibit 13:** Job losses in the US are concentrated in covid-sensitive...

	Total Payroll as of Feb-20		Change in Payroll as of Nov-20	
	(million)	(% of total)	(million)	(% of total)
Total	130	100.0%	-8.52	100.0%
Leisure & Hospitality	17	13.0%	-3.45	40.5%
Health Care	21	16.0%	-0.86	10.1%
Professional Services	22	16.6%	-1.06	12.5%
Retail Trade & Transportation	20	15.5%	-0.77	9.0%
Education	4	3.0%	-0.39	4.6%
Manufacturing	13	9.9%	-0.60	7.0%
Wholesale Trade	6	4.6%	-0.28	3.3%
Construction	8	5.9%	-0.28	3.3%
Others	20	15.5%	-0.83	9.7%

Source: BLS, Haver Analytics, Morgan Stanley Research. Note the majority of the decline in employment in professional services are due to declines in administrative and support services

**Exhibit 14:** ... and low-wage sectors



Source: BLS, Haver Analytics, Morgan Stanley Research

### 3) Accelerated restructuring would mean higher NAIURU in the near term

**Labor market may tighten earlier due to accelerated restructuring:** To be sure, our unemployment rate forecast, bullish as it is, still indicates that it will end the year above pre-Covid levels. At the same time, the recession has also led to an accelerated restructuring of businesses (the most prominent being the shift from offline retail to online). If some share of currently unemployed workers are not able to return to their original industries as the recovery progresses, this would require time-intensive upskilling and reallocation processes.

More fundamentally, the need for structural reallocation across sectors may raise frictional unemployment in the near and intermediate term. As research by the Brookings Institution shows, workers in sectors with the largest job losses also tend to have the lowest likelihood of moving to industries that are currently growing.

Labor markets may therefore tighten earlier than implied by the headline unemployment rate. In other words, we expect a higher natural rate of unemployment. Some would argue that this restructuring also took place on a greater scale during the global financial crisis, yet inflationary pressures did not result. Our counter-argument would be that deleveraging headwinds held back the pace of recovery, and the gradual recovery gave businesses and the labor market more than ample time to adjust. The issue is of particular importance in this cycle, especially if policy makers attempt to run



the economy hot. At the same time, higher unemployment due to the need for reallocation would make continued support for the unemployed necessary for longer, adding fiscal support to an already strong recovery. In either case, the end result is likely to be a further buildup of inflationary pressures.

#### 4) Continued policy action to address inequality

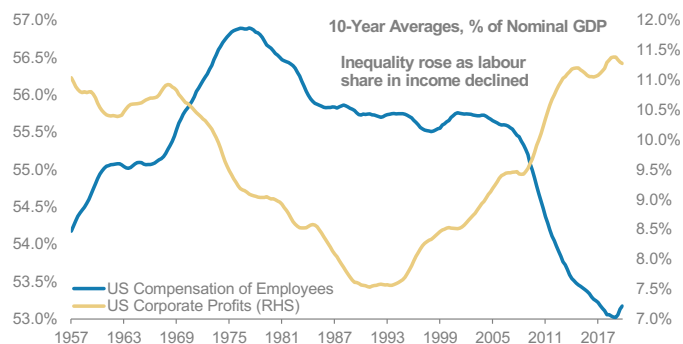
**Policy impetus to address inequality:** As we argued in our original report, we laid out the case that political and economic triggers were already in place prior to the recession to address the lower wage share in GDP and rising inequality. The Covid-19 shock has exacerbated the impact on lower income households, creating even greater urgency for policy makers to act to provide relief for affected households.

We see two implications from this policy push:

First, policy makers will use fiscal policy more actively. A second round of fiscal stimulus is being disbursed at the time of writing that will lift household incomes even further above pre-Covid levels. Further policy actions like the raising of minimum wages are being discussed and if enacted, will impart an inflationary impulse.

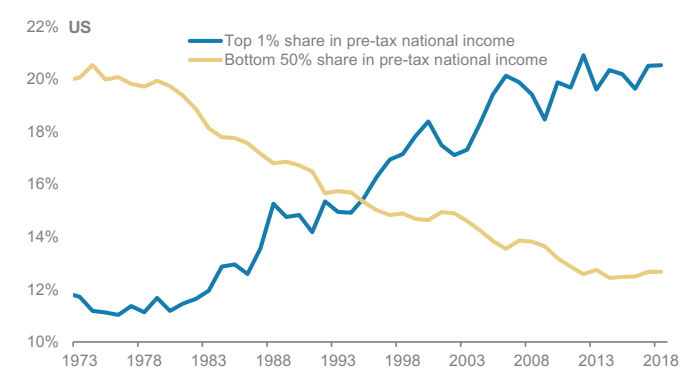
Second, policy makers are also increasingly focused on the role of tech, trade and titans. Since the 1990s, the steady interplay between this trio had a favourable impact on productivity and corporate profitability. Since capital goods are more tradeable in nature, stronger tech spending boosts trade directly, while technological advances have made transport and communications more efficient, fostering increased trade activity. For developed markets, global integration and competition have given corporate titans more incentive to innovate, increasing the potential for further productivity gains. Trade also aids technology transfer and diffusion, an additional avenue for productivity gains.

**Exhibit 15: Wage share in the US economy has been declining**



Source: BEA, Haver Analytics, Morgan Stanley Research; Note that compensation of employees and corporate profits do not sum to 100% because other components such as proprietors' income, rental income, net interest and miscellaneous payments, taxes on production and imports, business current transfer payments and current surplus of government enterprises are excluded.

**Exhibit 16: Rising inequality in the US**



Source: wid.world, BLS, Census Bureau, Haver Analytics, Morgan Stanley Research

Scrutiny over these factors have already risen (witness the moves to check globalization in the form of US/China trade tensions and the likely emergence of a multi-polar world – see [US Public Policy and Global Equity Research: Investing For a Multipolar World \(24 Jun 2020\)](#)) and have continued even in the midst of the pandemic and are likely to intensify. However, disrupting this trio of trade, tech and titans will also mean upsetting the driving forces behind the disinflationary trends over the last 30 years.

## 5) Monetary policy to accommodate initial rises in inflation

Monetary policy will also remain accommodative. In 2020, the Federal Reserve had conducted a review of its monetary policy strategies and has committed to its 2% average inflation goal, thereby aiming for a moderate overshoot of inflation. For more on the Fed's framework, please see [US Economics: The Fed's New Framework: This Time Is Different \(14 Sep 2020\)](#) by Ellen Zentner, the US economics and rates strategy teams. Unlike the previous cycle, when the Fed had tightened monetary policy well before inflation has moved above 2% sustainably, they are not likely to hike pre-emptively at the first uptick in inflation.

### What are the risks to the inflation outlook?

**Consensus is less upbeat about growth and hence inflation:** The majority of the consensus and the investors we have spoken with view the recovery in 2021 as less robust than we do. In particular, they foresee a longer timeframe for GDP to reach pre-Covid levels, hence they see a slower pace of decline in the unemployment rate. By implication, they see inflation reaching 2% later than we do, and they also don't see inflation overshooting 2%.

#### **We see two risk factors to our inflation forecast:**

**1) An "unstable" accelerating inflation path:** We are mindful that upside risks to the inflation outlook could intensify, particularly if the inflation process becomes more dynamic than we assume in our base case.

The key issues are first, uncertainty around the natural rate of unemployment in this cycle and second, the risk appetite of the private sector. If the accelerated restructuring of the economy means a higher NAIUR, highly reflationary policies will lead to wage and inflation pressures emerging earlier. In addition, a faster pace of reopening, aided by positive developments on the vaccine front, will also rekindle private sector risk appetite. With an accommodative monetary policy backdrop, this could translate into a faster uptick in credit creation and aggregate demand, pushing inflation higher as well.

In that scenario, inflation could move onto an "accelerating" path. Indications that inflation could cross 2.5% may result in a notably hawkish shift in expectations for Fed policy, with potential for attendant volatility in financial markets – especially if market-based measures of inflation expectations become unanchored to the upside.

Moreover, concerns about public debt sustainability have been held in abeyance precisely because of the expectation that real interest rates will remain lower for longer. If inflation prompts the Fed to shift to a more hawkish policy stance, higher real rates would bring these concerns back to the fore, which in turn could lead to an adverse tightening of financial conditions. This is a risk that, from our conversations, has not featured prominently, if at all.

**2) Pace of supply side adjustments:** Inflation is ultimately the end result of interactions between aggregate demand and aggregate supply. On the demand side, we have had a lightning recovery and on our forecasts, the recovery is set to gather further steam in 2021.

On the supply side, some have argued that a dynamic and fairly flexible US economy means that the supply side response can help keep inflationary pressures at bay. In particular, they point to the acceleration in technology investment even during the recession.

However, we note that non-technology investment, which also boosts productivity, has suffered. This is particularly the case for Covid-sensitive sectors, which have not only pulled back on investments but have also retrenched on the labor side. While a rise in investments will help to mitigate inflationary pressures from a longer term perspective, we believe that the labor market will be the binding constraint in the near term (as discussed earlier). In our base case, we see demand improvement outpacing that of supply, leading to the buildup of inflationary pressures.

However, if factor markets prove to be more flexible, this could keep inflationary pressures at bay. Under this scenario, this would have echoes of the late 1990s cycle, where a risk of asset bubbles and financial stability concerns may outweigh that of price stability concerns.

## Disclosure Section

The information and opinions in Morgan Stanley Research were prepared or are disseminated by Morgan Stanley & Co. LLC and/or Morgan Stanley C.T.V.M. S.A. and/or Morgan Stanley México, Casa de Bolsa, S.A. de C.V. and/or Morgan Stanley Canada Limited and/or Morgan Stanley & Co. International plc and/or Morgan Stanley Europe S.E. and/or RMB Morgan Stanley Proprietary Limited and/or Morgan Stanley MUFG Securities Co., Ltd. and/or Morgan Stanley Capital Group Japan Co., Ltd. and/or Morgan Stanley Asia Limited and/or Morgan Stanley Asia (Singapore) Pte. (Registration number 199206298Z) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H), regulated by the Monetary Authority of Singapore (which accepts legal responsibility for its contents and should be contacted with respect to any matters arising from, or in connection with, Morgan Stanley Research) and/or Morgan Stanley Taiwan Limited and/or Morgan Stanley & Co International plc, Seoul Branch, and/or Morgan Stanley Australia Limited (A.B.N. 67 003 734 576, holder of Australian financial services license No. 233742, which accepts responsibility for its contents), and/or Morgan Stanley Wealth Management Australia Pty Ltd (A.B.N. 19 009 145 555, holder of Australian financial services license No. 240813, which accepts responsibility for its contents), and/or Morgan Stanley India Company Private Limited, regulated by the Securities and Exchange Board of India ("SEBI") and holder of licenses as a Research Analyst (SEBI Registration No. INH000001105), Stock Broker (BSE Registration No. INB011054237 and NSE Registration No. INB/INF231054231), Merchant Banker (SEBI Registration No. INM000011203), and depository participant with National Securities Depository Limited (SEBI Registration No. IN-DP-NSDL-372-2014) which accepts the responsibility for its contents and should be contacted with respect to any matters arising from, or in connection with, Morgan Stanley Research, and/or PT. Morgan Stanley Sekuritas Indonesia and their affiliates (collectively, "Morgan Stanley").

For important disclosures, stock price charts and equity rating histories regarding companies that are the subject of this report, please see the Morgan Stanley Research Disclosure Website at [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures), or contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY, 10036 USA.

For valuation methodology and risks associated with any recommendation, rating or price target referenced in this research report, please contact the Client Support Team as follows: US/Canada +1 800 303-2495; Hong Kong +852 2848-5999; Latin America +1 718 754-5444 (U.S.); London +44 (0)20-7425-8169; Singapore +65 6834-6860; Sydney +61 (0)2-9770-1505; Tokyo +81 (0)3-6836-9000. Alternatively you may contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY 10036 USA.

### Global Research Conflict Management Policy

Morgan Stanley Research has been published in accordance with our conflict management policy, which is available at [www.morganstanley.com/institutional/research/conflictolicies](http://www.morganstanley.com/institutional/research/conflictolicies). A Portuguese version of the policy can be found at [www.morganstanley.com.br](http://www.morganstanley.com.br)

### Important Disclosures

Morgan Stanley is not acting as a municipal advisor and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

Morgan Stanley Research does not provide individually tailored investment advice. Morgan Stanley Research has been prepared without regard to the circumstances and objectives of those who receive it. Morgan Stanley recommends that investors independently evaluate particular investments and strategies, and encourages investors to seek the advice of a financial adviser. The appropriateness of an investment or strategy will depend on an investor's circumstances and objectives. The securities, instruments, or strategies discussed in Morgan Stanley Research may not be suitable for all investors, and certain investors may not be eligible to purchase or participate in some or all of them. Morgan Stanley Research is not an offer to buy or sell or the solicitation of an offer to buy or sell any security/instrument or to participate in any particular trading strategy. The value of and income from your investments may vary because of changes in interest rates, foreign exchange rates, default rates, prepayment rates, securities/instruments prices, market indexes, operational or financial conditions of companies or other factors. There may be time limitations on the exercise of options or other rights in securities/instruments transactions. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. If provided, and unless otherwise stated, the closing price on the cover page is that of the primary exchange for the subject company's securities/instruments.

The fixed income research analysts, strategists or economists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality, accuracy and value of research, firm profitability or revenues (which include fixed income trading and capital markets profitability or revenues), client feedback and competitive factors. Fixed Income Research analysts', strategists' or economists' compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

With the exception of information regarding Morgan Stanley, Morgan Stanley Research is based on public information. Morgan Stanley makes every effort to use reliable, comprehensive information, but we make no representation that it is accurate or complete. We have no obligation to tell you when opinions or information in Morgan Stanley Research change apart from when we intend to discontinue equity research coverage of a subject company. Facts and views presented in Morgan Stanley Research have not been reviewed by, and may not reflect information known to, professionals in other Morgan Stanley business areas, including investment banking personnel.

Morgan Stanley may make investment decisions that are inconsistent with the recommendations or views in this report.

To our readers based in Taiwan or trading in Taiwan securities/instruments: Information on securities/instruments that trade in Taiwan is distributed by Morgan Stanley Taiwan Limited ("MSTL"). Such information is for your reference only. The reader should independently evaluate the investment risks and is solely responsible for their investment decisions. Morgan Stanley Research may not be distributed to the public media or quoted or used by the public media without the express written consent of Morgan Stanley. Any non-customer reader within the scope of Article 7-1 of the Taiwan Stock Exchange Recommendation Regulations accessing and/or receiving Morgan Stanley Research is not permitted to provide Morgan Stanley Research to any third party (including but not limited to related parties, affiliated companies and any other third parties) or engage in any activities regarding Morgan Stanley Research which may create or give the appearance of creating a conflict of interest. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities/instruments. MSTL may not execute transactions for clients in these securities/instruments.

Morgan Stanley is not incorporated under PRC law and the research in relation to this report is conducted outside the PRC. Morgan Stanley Research does not constitute an offer to sell or the solicitation of an offer to buy any securities in the PRC. PRC investors shall have the relevant qualifications to invest in such securities and shall be responsible for obtaining all relevant approvals, licenses, verifications and/or registrations from the relevant governmental authorities themselves. Neither this report nor any part of it is intended as, or shall constitute, provision of any consultancy or advisory service of securities investment as defined under PRC law. Such information is provided for your reference only.

Morgan Stanley Research is disseminated in Brazil by Morgan Stanley C.T.V.M. S.A. located at Av. Brigadeiro Faria Lima, 3600, 6th floor, São Paulo - SP, Brazil; and is regulated by the Comissão de Valores Mobiliários; in Mexico by Morgan Stanley México, Casa de Bolsa, S.A. de C.V. which is regulated by Comisión Nacional Bancaria y de Valores. Paseo de los Tamarindos 90, Torre 1, Col. Bosques de las Lomas Floor 29, 05120 Mexico City; in Japan by Morgan Stanley MUFG Securities Co., Ltd. and, for Commodities related research reports only, Morgan Stanley Capital Group Japan Co., Ltd; in Hong Kong by Morgan Stanley Asia Limited (which accepts responsibility for its contents) and by Morgan Stanley Asia International Limited, Hong Kong Branch; in Singapore by Morgan Stanley Asia (Singapore) Pte. (Registration number 199206298Z) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H), regulated by the Monetary Authority of Singapore (which accepts legal responsibility for its contents and should be

contacted with respect to any matters arising from, or in connection with, Morgan Stanley Research) and by Morgan Stanley Asia International Limited, Singapore Branch (Registration number T11FC0207F); in Australia to "wholesale clients" within the meaning of the Australian Corporations Act by Morgan Stanley Australia Limited A.B.N. 67 003 734 576, holder of Australian financial services license No. 233742, which accepts responsibility for its contents; in Australia to "wholesale clients" and "retail clients" within the meaning of the Australian Corporations Act by Morgan Stanley Wealth Management Australia Pty Ltd (A.B.N. 19 009 145 555, holder of Australian financial services license No. 240813, which accepts responsibility for its contents; in Korea by Morgan Stanley & Co International plc, Seoul Branch; in India by Morgan Stanley India Company Private Limited; in Vietnam this report is issued by Morgan Stanley Singapore Holdings; in Canada by Morgan Stanley Canada Limited, which has approved of and takes responsibility for its contents in Canada; in Germany and the European Economic Area where required by Morgan Stanley Europe S.E., regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin); in Spain by Morgan Stanley, S.V., S.A., a Morgan Stanley group company, which is supervised by the Spanish Securities Markets Commission (CNMV) and states that Morgan Stanley Research has been written and distributed in accordance with the rules of conduct applicable to financial research as established under Spanish regulations; in the United States by Morgan Stanley & Co. LLC, which accepts responsibility for its contents. Morgan Stanley & Co. International plc, authorized by the Prudential Regulatory Authority and regulated by the Financial Conduct Authority and the Prudential Regulatory Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. RMB Morgan Stanley Proprietary Limited is a member of the JSE Limited and A2X (Pty) Ltd. RMB Morgan Stanley Proprietary Limited is a joint venture owned equally by Morgan Stanley International Holdings Inc. and RMB Investment Advisory (Proprietary) Limited, which is wholly owned by FirstRand Limited.

The trademarks and service marks contained in Morgan Stanley Research are the property of their respective owners. Third-party data providers make no warranties or representations relating to the accuracy, completeness, or timeliness of the data they provide and shall not have liability for any damages relating to such data. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and S&P.

Morgan Stanley Research, or any portion thereof may not be reprinted, sold or redistributed without the written consent of Morgan Stanley.

Indicators and trackers referenced in Morgan Stanley Research may not be used as, or treated as, a benchmark under Regulation EU 2016/1011, or any other similar framework.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (DIFC Branch), regulated by the Dubai Financial Services Authority (the DFSA), and is directed at Professional Clients only, as defined by the DFSA. The financial products or financial services to which this research relates will only be made available to a customer who we are satisfied meets the regulatory criteria to be a Professional Client.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (QFC Branch), regulated by the Qatar Financial Centre Regulatory Authority (the QFCRA), and is directed at business customers and market counterparties only and is not intended for Retail Customers as defined by the QFCRA.

As required by the Capital Markets Board of Turkey, investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided exclusively to persons based on their risk and income preferences by the authorized firms. Comments and recommendations stated here are general in nature. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations.

© 2021 Morgan Stanley