

Research US

Higher inflation but not spinning out of control due to still well-behaved expectations

This is the fourth publication in our series on global inflation. Here we look at the drivers for US inflation and what to expect over the next 1-2 years. Links to our previous publications can be found in the box to the right.

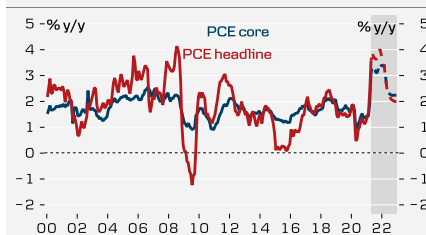
Key takeaways

- In this piece, we take a deep dive into the US inflation dynamics. We go through different drivers both from a top-down and bottom-up perspective. **Based on our analysis, we project PCE inflation will be 3.3% y/y this year and 2.5% y/y next year (PCE core inflation: 2.8% y/y and 2.6% y/y)**, see also chart 1.
- Inflation expectations** suggest that inflation will be higher on a sustained basis compared to the years before the pandemic hit. A downside risk is that inflation expectations may decline when inflation peaks (all else equal).
- Higher **money velocity** would be inflationary but we doubt that M2 money velocity will return all the way back to its pre-pandemic level, as some of the money are spent on transactions not included in GDP (like real estate transactions and transactions in financial assets, where we have already seen large price increases).
- Some of the broad price increases may take time to materialise due to **sticky prices**.
- We expect higher **wage growth**, reflecting both higher inflation expectations and higher demand for labour. This should support higher inflation on a more sustained-basis. The Phillips curve relationship has been weak for several years, likely because inflation expectations have become well-anchored.
- Rising food and commodity prices** mean higher headline inflation and inflation expectations. As we do not expect the economy to enter a commodities super cycle, we expect food and commodities price inflation to ease, which should also ease total headline inflation and all else equal pull inflation expectations lower.
- PCE core goods inflation is likely to remain high for now.** A stronger USD and lower goods demand should slow PCE core goods inflation in 2022.
- PCE core services excluding housing and health care** inflation is, in the long-run, mostly driven by inflation expectations. The current level of long-term inflation expectations suggest PCE core services excluding housing and health care inflation will run around 2.5-3.0% y/y.
- Rent** have started to increase sharply after the slowdown in 2020 and early 2021. We expect higher rent inflation near-term but since we expect house price increases will slow down somewhat, we expect rent inflation will settle at around 3.5% y/y.
- Wage growth is important for PCE health care inflation. **If wage growth increases due to higher inflation expectations** we are likely to see higher PCE health care inflation also further out. We expect PCE health care inflation to run around 3% y/y.

Inflation series - links

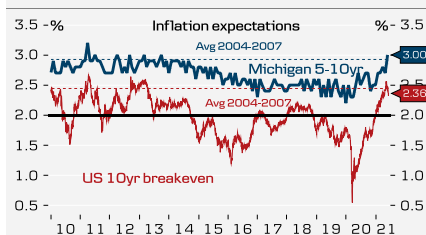
- Part 1: *Global Research: Global manufacturing heading for a hot [inflation] summer*, 12 May
- Part 2: *Global Research: The impact on inflation of a commodities super cycle*, 26 May
- Part 3: *Research Euro Area – Mind the inflation gap*, 8 June

Chart 1: Updated US inflation forecasts



Sources: BEA, Macrobond Financial, Danske Bank forecasts

Chart 2: Inflation expectations back to normal



Note: Past performance is not a reliable indicator of current or future results.

Sources: Michigan, Bloomberg, Macrobond Financial, Danske Bank

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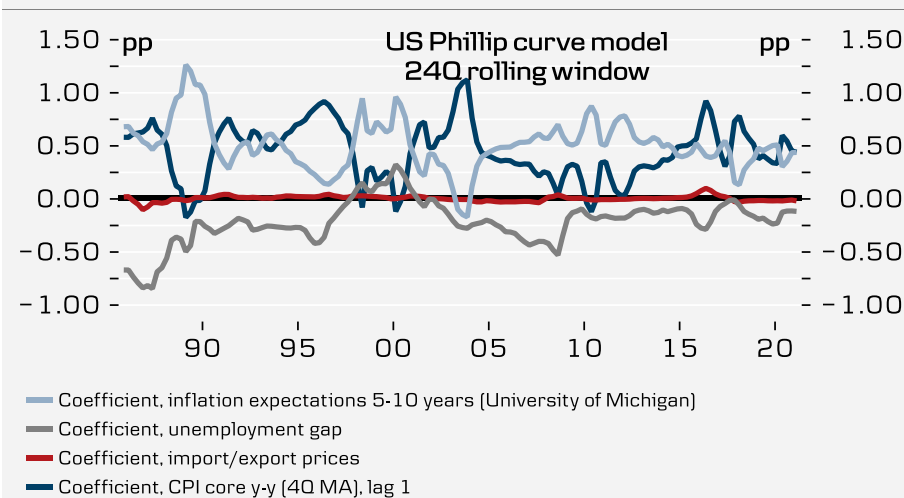
Top-down analysis

Inflation expectations: Inflation is set to be higher than before the pandemic

We think it is fair to say that economists do not understand the inflation dynamics as well as we would like to. That said, economists usually put a lot of weight on inflation expectations as an important driver of actual inflation, especially in the long-run. In particular now that it seems like the “Phillips curve is dead”, as the tight labour market before the pandemic was not enough to create higher underlying inflation on a sustained basis. This is also one of the key arguments for why the Fed has changed its monetary policy setup.

We have estimated the Phillips curve in the US, where we try to explain CPI core inflation from inflation expectations (consumer-based from University of Michigan), the unemployment gap, import/export prices and lagged inflation. As shown in chart 3, the coefficients for import/export prices and unemployment gap are quite low. Especially the coefficient for unemployment is interesting, as it hints a tight labour market is not really good at explaining core inflation. Instead lagged inflation and inflation expectations explain most of the movements suggesting consumers have adaptive expectations. To us, this tells us two important things: The first is that higher inflation expectations will become self-fulfilling over time. The second is that higher inflation (for whatever reason) may imply higher inflation for quite some time (“second-round effects”).

Chart 3: Inflation expectations and lagged inflation explain most of the



Note: CPI core model based on inflation expectations (University of Michigan), lagged core inflation, unemployment rate gap and import/export prices

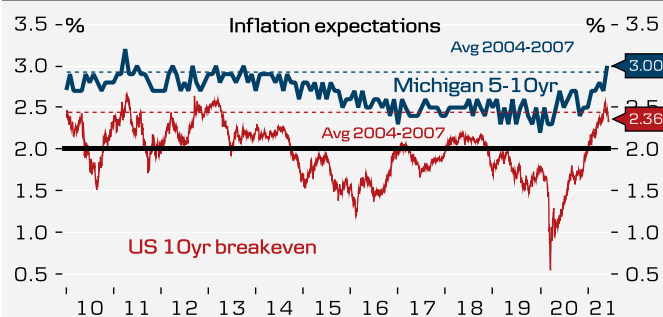
Looking at inflation expectations, both market-based and survey-based measures have risen significantly in recent months, especially near-term expectations. 1yr University of Michigan inflation expectations are now 4.6%, which looks like what we saw in 2008 and 2011. Long-term 5-10 year inflation expectations have also risen but not as much as short-term expectations. They are now back to the levels prevailing before we talked about central banks struggling with too low inflation and the effective lower bound. US breakeven inflation rates are also back to more “normal” levels but interestingly 5y5y inflation expectations remain to the low side in a historical perspective. Neither market-based nor survey-based inflation expectations indicate that inflation is spinning out of control, just

that inflation is moving back to levels we were used to before the financial crisis. We show US 10yr breakeven inflation and long-term consumer inflation expectations from University of Michigan in chart 4.

A word of caution: Since consumers seem to have adaptive expectations, inflation expectations may start to decline when inflation peaks, see chart 5. A risk to the upside is if we are in the middle of a regime shift, which investors are having a hard time capturing. This is probably something the Fed will have to monitor given there is a limit to how high they can allow inflation expectations to move up.

Conclusion: Inflation expectations suggest that inflation will be higher on a sustained basis compared to the years before the pandemic hit. A downside risk is that inflation expectations may decline when headline inflation peaks (all else equal).

Chart 4: Both consumer-based and market-based inflation expectations are back to the levels prevailing before the financial crisis (before we talked about the effective lower bound and central banks struggling with too low inflation)



Note: Past performance is not a reliable indicator of current or future results. Sources: Michigan, Bloomberg, Macrobond Financial, Danske Bank

Chart 5: Risk - will a peak in actual headline inflation lead to lower inflation expectations?



Note: Past performance is not a reliable indicator of current or future results. Sources: BLS, Macrobond Financial, Danske Bank calculations

Money velocity

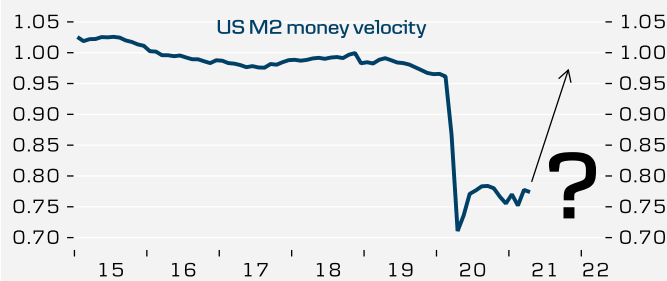
We know from economic theory that money supply (M) times money velocity, i.e. how often money shifts hands, (V) equals to the nominal value of transactions (P*T). So $M*V=P*T$. This means that higher money supply will lead to an increase in either the number of transactions or prices if velocity is assumed unchanged. The Federal Reserve has increased money supply a lot due to the pandemic but money velocity has taken a hit because of restrictions and people's fear of getting infected with COVID-19. The big question is whether we are going to see money velocity returning back to its pre-pandemic level once all restrictions are lifted and people no longer fear catching COVID-19 in the US. If so this would be inflationary as soon as the US reaches its capacity limit.

As we do not have data for the total number of transactions in the economy, economists usually use nominal GDP (P*Y) as a proxy for the nominal value of transactions (P*T). We use total monthly private consumption to calculate the money velocity (calculated as P*Y divided by M2) on a monthly basis using consumption as a proxy for nominal GDP (which we only have on a quarterly basis). Monthly M2 money velocity remains subdued despite total private consumption is actually higher now than in February 2020 before COVID-19 hit the US with M2 money velocity still 25% lower, see chart 6. With total private consumption already above its pre-pandemic level (which, however, is hiding the fact that demand for goods is high and demand for services is low), this suggests very high inflation for money velocity to return back to its pre-pandemic level.

We are, however, having a hard time seeing why M2 money velocity should return all the way back to its pre-pandemic level. We recognise that the Federal Reserve has created a lot of money but neither nominal GDP nor nominal private consumption capture all transactions in the economy. There are plenty of transactions in the economy, which are not included in GDP, like real estate transactions and financial assets transactions. Some of the money creation has showed up as asset price inflation instead of consumer price inflation. For M2 money growth see chart 7.

Conclusion: Higher money velocity would be inflationary but we doubt that M2 money velocity will return all the way back to its pre-pandemic level, as some of the money are spent on transactions not included in GDP (like real estate transactions and financial assets transactions, where we have already seen large price increases). We think velocity will move somewhat higher up indicating higher inflation (as well as real GDP moving above the pre-pandemic trend).

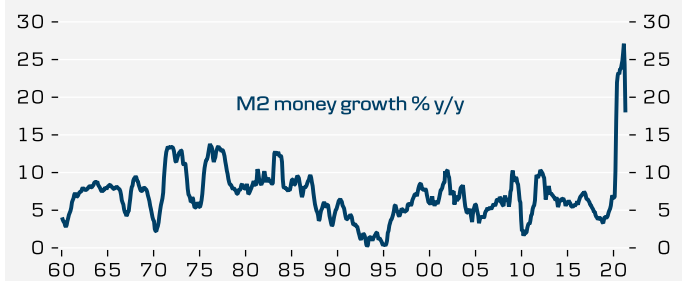
Chart 6: Inflation will move significantly higher if money velocity rebounds back to its pre-pandemic level



Note: Monthly M2 money velocity is calculated as nominal private consumption (monthly) divided by M2 (monthly)

Sources: BEA, Federal Reserve, Macrobond Financial

Chart 7: Very high M2 money growth

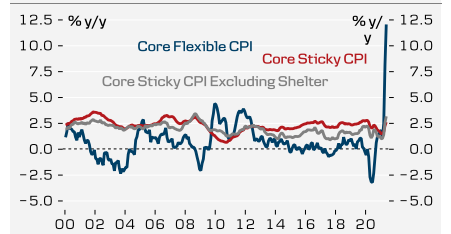


Sources: Federal Reserve, Macrobond Financial

Sticky vs flexible prices

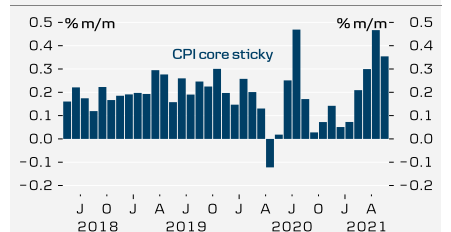
One of the hottest topics is whether the price increases that we have seen so far are temporary or more sustained in nature. This also boils down to the discussion whether prices are flexible or sticky. Flexible consumer prices like gasoline, food prices, car prices, apparel change quickly. Sticky prices (like insurances, rent, education, restaurant prices, recreation etc.) are changed only infrequently like once per year. Some economic studies suggest prices are changed once every 3-4 quarters, see e.g. *Smets and Wouters (2007)*, *Nakamura and Steinsson (2008)* and *Justiniano, Primiceri and Tambalotti (2013)*. In economic theory this is due to (among other things) so-called “menu costs” (it is costly to change prices all the time, contracts etc.). According to economic theory, businesses with sticky prices should take inflation expectations better into account, as they would like price changes to also reflect future expected inflation (as they can only change prices infrequently). This also suggests that sticky prices should be less volatile than flexible prices. This is exactly what Atlanta Fed finds with core flexible CPI inflation now running at 12.1% y/y with core sticky CPI inflation still more muted, see chart 8. That said, we also see that the monthly increases in CPI core sticky have been increasing in recent months, see chart 9.

Chart 8: Flexible prices are much more volatile than sticky prices



Sources: Atlanta Fed, Macrobond Financial

Chart 9: Monthly price increases in CPI core sticky have been rising



Sources: Atlanta Fed, Macrobond Financial

What we would like to highlight in this section is that one cannot say that higher inflation is only transitory based on the fact that only few items are driving inflation higher right now. This may just reflect that not all businesses have had the possibility to change their prices reflecting a more inflationary environment and higher inflation expectations yet. For instance, used car prices are rising a lot at the moment. It could be the case that this is just transitory, but it could also be the case that other prices will jump soon as well.

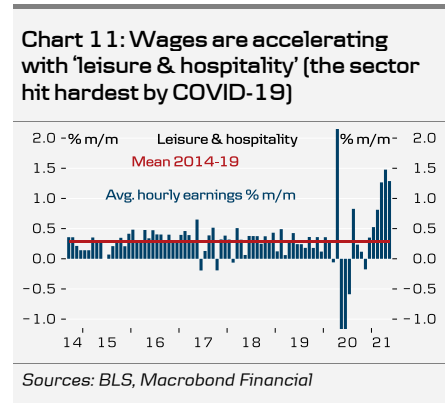
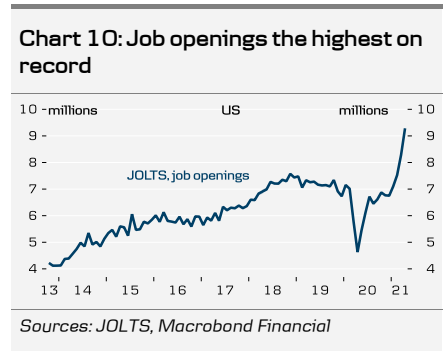
Conclusion: This is probably the most difficult thing to analyse. Given inflation expectations have risen, we expect inflation will be at a higher level on a sustained basis than pre-pandemic, as we are likely to see broad price increases. Some may take time to materialise due to sticky prices.

Wage growth is increasing due to labour supply constraints

Another factor to look at is wage pressure. While the Phillips curve does not seem to be very important for actual inflation (which we discussed in the section on inflation expectations), we probably need to see inflation expectations reflected in wage growth to higher inflation on a sustained basis. Also it is noteworthy that wage growth may increase due to higher productivity growth, which is not inflationary in itself.

Looking at the US labour, it is clear from several indicators that demand for labour is quite high: Job openings are record-high (see chart 10), voluntary quits are much higher than layoffs and discharges, businesses have difficulties finding qualified workers and the ‘jobs plentiful/hard to get’ ratio is nearly back to pre-pandemic levels. There are, however, signs of labour supply constraints and the participation rate remains significantly below pre-pandemic levels. It may very well be the case that more people return back to the labour force when the temporarily higher unemployment benefits expire no later than on 6 September (earlier in some states). However, it may also be the case that some people have permanently left the labour force (due to e.g. early retirement). This likely explains why we have seen higher wage growth within ‘leisure & hospitality’ lately, as demand for labour has exceeded supply, see chart 11. As we expect more people to return back to the labour force in the second half of the year, there is likely a limit to how much wage growth can accelerate. We expect nominal wage growth (as measured by average hourly earnings) eventually will stabilise in the range 3.5-4.0% (higher than before the pandemic) due to higher inflation expectations.

Conclusion: We expect higher wage growth, partly reflecting higher inflation expectations and partly higher demand for labour. On this background, we expect nominal wage growth (as measured by average hourly earnings) will stabilise in the range 3.5%-4.0% eventually. This should support higher inflation on a more sustained-basis but not inflation spinning out of control. The Phillips curve relationship has been weak for several years, likely because inflation expectations have become well-anchored.



Bottom-up analysis

Analysis

In the following sections, we will analyse US inflation from a bottom-up perspective looking at food and energy, core goods, core services (excluding housing and health care), housing and health care. The weights in CPI and PCE are different, which also explain why the two inflation measures are not exactly the same, see table 1.

Food and energy

We discussed the impact of commodity prices in more details in *Global Research: The impact on inflation of a commodities super cycle*, 26 May. As we argued in the piece, swings in US headline inflation are usually driven by big swings in commodity prices, not least oil prices (energy accounts for 6.2% of total CPI). The relationship between oil prices and PCE energy is shown in chart 12. This also means that oil price developments are very important for where headline inflation is heading in coming years. It is also important to recognise that US inflation is more exposed to oil price volatility than euro area inflation due to lower taxes. The pass-through to consumer prices is much higher.

Looking at food prices, higher food prices also push headline inflation higher (food accounts for 14.1% of total CPI inflation) but the relationship is not as strong as for oil (not close to one-to-one and the impact comes with a lag), see chart 13.

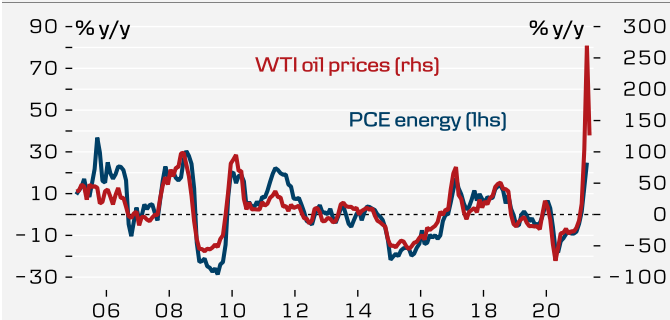
Conclusion: Rising food and commodity prices mean higher headline inflation and inflation expectations. As we do not expect the economy to enter a commodities super cycle, we expect food and commodities price inflation to ease, which should also ease total headline inflation and, at least all else equal pull, inflation expectations lower.

Table 1: CPI and PCE weights

2020	CPI weights (%)	PCE weights (%)
Total	100	100
Core	79.7	88.6
Core goods	20.2	23.4
Core services (ex housing and health care)	18.9	31.1
Housing	33.3	17.0
Health care	7.3	17.0
Food	14.1	7.8
Energy	6.2	3.6

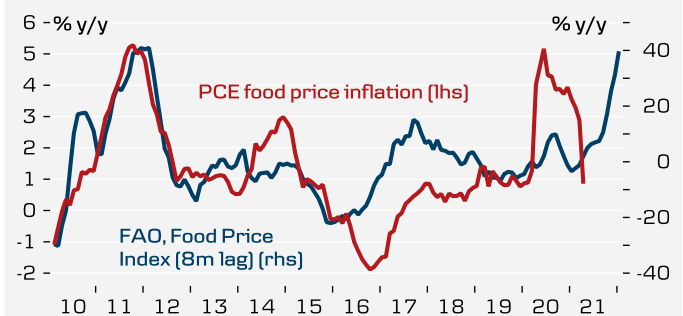
Sources: BEA, BLS, Danske Bank calculations

Chart 12: PCE energy depends on oil price changes



Note: Past performance is not a reliable indicator of current or future results. Sources: BEA, Macrobond Financial

Chart 13: US food price inflation is set to increase from here due to rising global food prices



Note: Past performance is not a reliable indicator of current or future results. Sources: BLS, FAO, Macrobond Financial

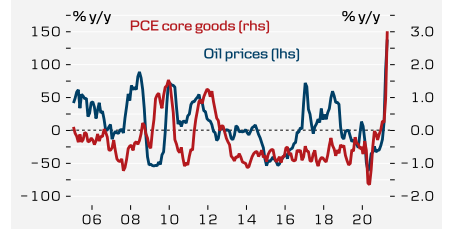
PCE core goods: High for now but a stronger USD and a peak in goods demand should slow PCE core goods inflation

Oil prices are seemingly not a very good indicator for PCE core goods prices and the relationship seems weak, see chart 14. To us, this suggests that other factors like USD movements, competition and globalisation are more important for core goods prices. That is also the conclusion from this *IMF Working Paper (2016/124) by Abdih, Balakrishnan and Shang (2016)*. Abdih, Balakrishnan and Shang find that PCE core goods inflation is mainly explained by lagged PCE core goods inflation (inertia) and nonpetroleum import prices (which, again, is mostly explained by USD movements), see chart 15. Inflation expectations do not, according to the analysis, explain a lot of the price changes in PCE core goods inflation (PCE core goods prices have been falling most years since 1996 despite positive inflation expectations).

The increases we have seen in PCE core goods lately imply that we may see positive PCE core goods inflation for some quarters (after years with deflation). However, if we are right about broad USD appreciation in the second half, PCE core goods inflation should peak and move lower again next year, see chart 16. As we argued in *Global Research: Global manufacturing heading for a hot (inflation) summer*, 12 May, we expect the manufacturing overheating will continue over the summer but that goods demand and commodity price inflation should ease when start to spend more on services and supply of goods and materials increases on the back of new investments.

Conclusion: PCE core goods inflation is likely to remain positive for now and a few quarters onwards. A stronger USD and lower goods demand should slow PCE core goods inflation in 2022.

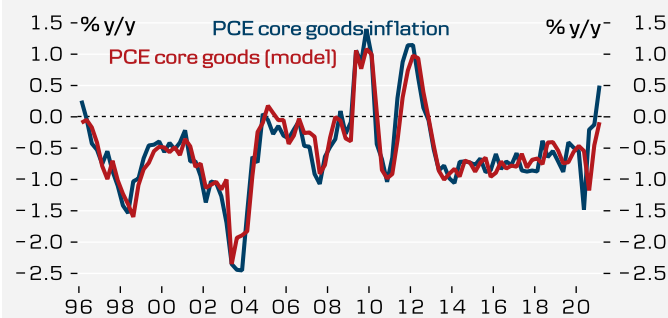
Chart 14: Historically, not a strong link between PCE core goods inflation and oil prices



Note: Past performance is not a reliable indicator of current or future results

Sources: BEA, Macrobond Financial

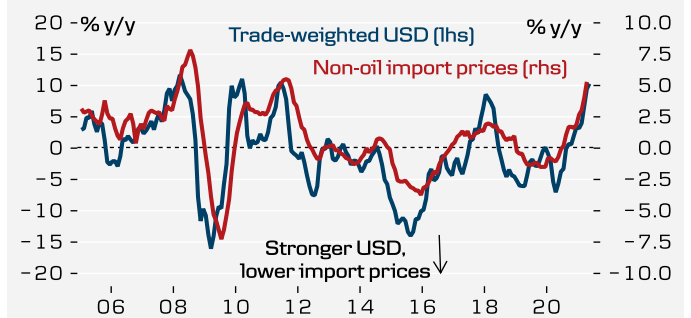
Chart 15: PCE core goods inflation is mostly explained by lagged PCE core goods inflation and non-oil import prices



Note: PCE core goods inflation modelled on lagged PCE core goods inflation, non-oil import prices and two dummies (2003Q2 and 2009Q2) due to tax changes. R2=0.82

Sources: BEA, Macrobond Financial, IMF Working Paper Abdih, Balakrishnan and Shang (2016)

Chart 16: Non-oil import prices depend on USD (stronger USD, lower import prices, factor 2:1).



Note: Past performance is not a reliable indicator of current or future results. It is not possible to invest directly in an index.

Sources: ICE, BLS, Macrobond Financial

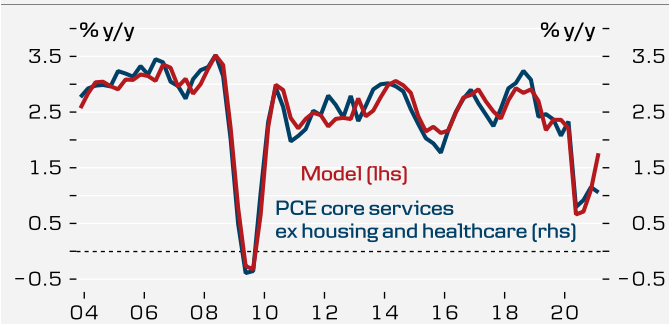
PCE core services excluding housing and healthcare: Higher inflation expectations needed for higher inflation on a sustained basis

We have divided this section into three parts. One is covering PCE core services excluding housing and healthcare (CSEHH), one is covering shelter and one is covering housing. As we argued in the section covering inflation expectations, inflation expectations are very important for actual inflation, which is visible in CSEHH (unlike PCE core goods). Our model based on *IMF Working Paper (2016/124) by Abdih, Balakrishnan and Shang (2016)* shows that CSEHH inflation is explained by lagged CSEHH inflation, long-term inflation expectations, non-oil import prices and the unemployment rate gap, see chart 17. In particular, it seems like inflation expectations determine CSEHH in the long-run (CSEHH inflation fluctuates around long-term inflation expectations but usually drops in the beginning of recessions before moving back to the level of inflation expectations, see chart 18). This means that we may see higher CSEHH inflation near-term (not only due to base effects) but higher long-term inflation expectations are needed for CSEHH inflation to stay above 3% on a sustained basis.

While most of PCE core services excluding housing and health care are driven by inflation expectations, the transportation component (consisting of air transportation among other things) also depends on oil price development, which is the reason why you still see some co-movement between oil prices and core inflation.

Conclusion: PCE core services excluding housing and health care inflation is, in the long-run, mostly driven by inflation expectations. The current level of long-term inflation expectations suggest PCE core services excluding housing and healthcare inflation will run around 2.5-3.0% y/y.

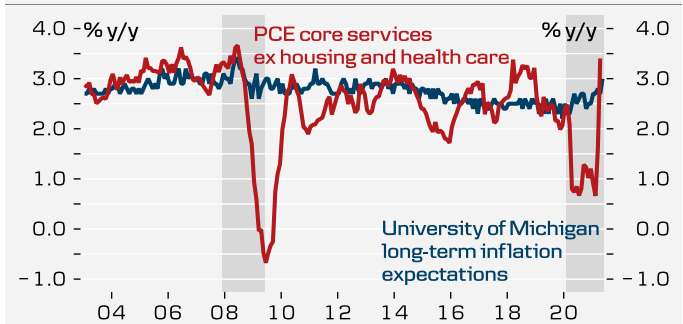
Chart 17: PCE core services excluding housing and healthcare explained by inflation expectations, non-oil import prices and the unemployment rate gap



Note: PCE core services excluding housing and healthcare modelled on lagged PCE core services excluding housing and healthcare inflation, non-oil import prices, long-term inflation expectations and the unemployment rate gap (using CBO's NAIRU estimate). $R^2=0.91$

Sources: BEA, CBO, University of Michigan, Macrobond Financial, IMF Working Paper Abdih, Balakrishnan and Shang (2016), Danske Bank calculations

Chart 18: PCE core services excluding housing and healthcare inflation well-anchored by inflation expectations



Note: Grey areas are recessions (NBER definition)

Sources: BEA, University of Michigan, NBER, Danske Bank calculations

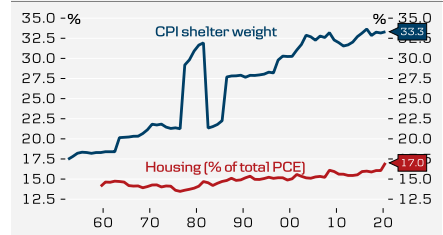
Housing: Higher rent will push inflation higher

In the US, rent accounts for a large share of total inflation, but how much differ for CPI and PCE, which explains some of the differences between the two measures, see chart 19. Shelter (consisting of rent of primary residence, lodging away from home and owners' equivalent rent of residences) accounted for 33% of total CPI in 2020 and the share has been increasing steadily since the 50s. In PCE, housing (rental of tenant-occupied nonfarm housing, imputed rental of owner-occupied nonfarm housing, rental value of farm dwellings and group housing) accounted for 17% of total consumption last year. CPI shelter and PCE housing inflation are more or less moving in tandem.

Rent increases slowed significantly because of the pandemic and fell significantly below the monthly average in 2014-19 of 0.26% per month. Since then both the housing market and apartment rental prices have increased significantly. Both indicators suggest that the shelter component should rise significantly and we will not be surprised if the annual growth rate in rent will increase to something like 4%, see chart 21 and 22. The monthly growth rate in CPI shelter has already risen above the 2014-19 average and the increase in April was the highest since 2017, see chart 20.

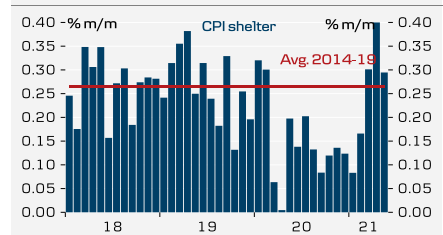
Conclusion: Rent has started to increase sharply after the slowdown in 2020 and early 2021. We expect higher rent inflation near-term but since we expect house price increases will slow, we expect rent inflation will settle at around 3.5% y/y.

Chart 19: Rent accounts for a large share of US inflation



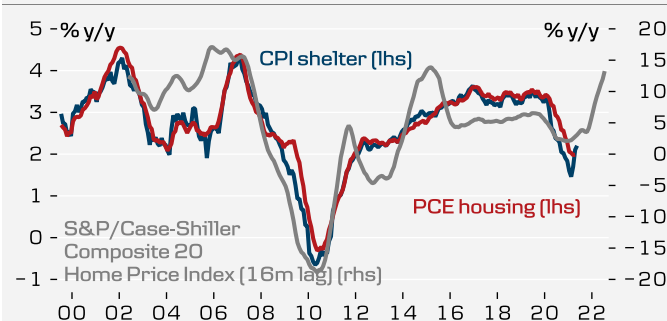
Sources: BEA, BLS, Macrobond Financial

Chart 20: Shelter is rising faster again after slowdown in 2020 and early 2021



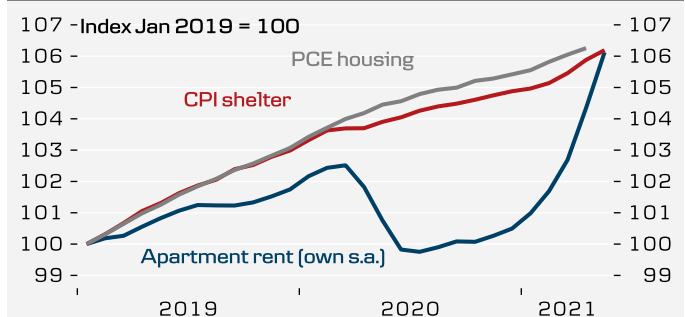
Sources: BLS, Macrobond Financial

Chart 21: Rising house prices indicate rising rent



Sources: BEA, BLS, S&P, Macrobond Financial

Chart 22: Apartment rent is rising at a fast pace (although not the best indicator rent in CPI/PCE)



Sources: Apartment List, BEA, BLS, Macrobond Financial

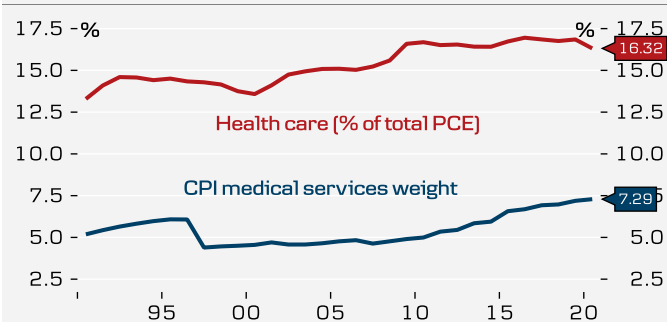
Health care: Rising wages put upward pressure on health care inflation

Health care services are important for US inflation but account for a larger share in PCE than in CPI, see chart 22. That said, it is difficult to find a good model for health care inflation. We like to look at wage growth (measured by the Employment Cost Index (ECIHC) for health care), which since the beginning of the 00s has had an okay-ish relationship with PCE health care inflation. That said, there are clearly also other factors at play. PCE health care inflation has exceeded ECIHC lately so we probably need higher wage growth for health care inflation to stay high, see chart 24. This could happen if higher inflation expectations are reflected in wage growth over time. With long-term inflation

expectations around 3% y/y, we should see PCE health care inflation stabilising at least around that level (and possibly higher).

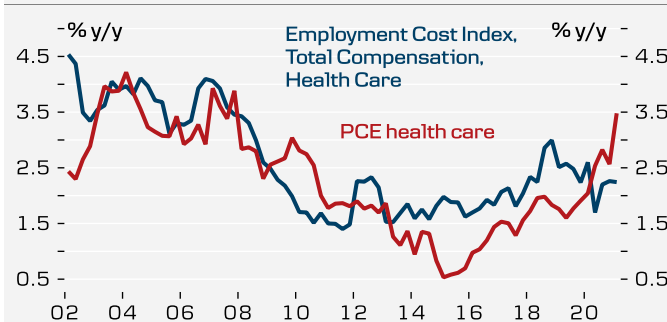
Conclusion: Wage growth is important for PCE health care inflation. If wage growth increases due to higher inflation expectations we are likely to see higher PCE health care inflation also further out. We expect PCE health care inflation to run at least around 3% y/y (and possibly higher).

Chart 23: Health care services account for a larger share of PCE than CPI



Sources: BEA, BLS, Macrobond Financial

Chart 24: Wage growth explains a lot of price changes in PCE health care



Sources: BEA, BLS, Macrobond Financial

PPI: Historically little predictive power towards CPI

The producer price index (PPI) generally has little predictive power towards CPI. Changes in the headline CPI typically follow the headline PPI due to the energy component, but the correlation is much weaker for core components, see chart 25.

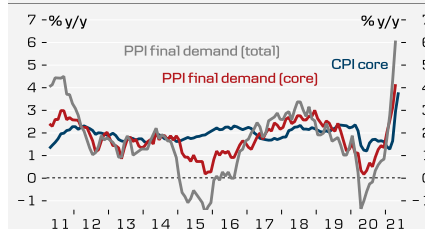
The differences between the indices are related to their different purposes. PPI is used to calculate the real growth in output, whereas CPI is used to measure the cost of living. Firstly, PPI excludes effects of imports, so for example, the strong retail demand for Chinese manufactured goods does not show up in the PPI. On the other hand, PPI does include prices of durable goods sold to other producers, which do not directly affect the cost of living. CPI also includes transportation costs of goods after producers have sold them, which especially over the past months has supported the CPI relative to the PPI, as transportation costs have risen with higher oil prices. Other differences include the fact that CPI includes owner's equivalent rent, which again is supported by rising housing prices. PPI also includes medical services not paid by the consumer (e. g. employers or the government), although this has not been a key driver of the differences as of late.

From the subcomponents of the PPI, core goods and transportation services have historically had some statistically significant explanatory power towards the core CPI. But as said, over the pandemic period, the transportation costs in the PPI have remained quite stable despite rising clearly in the CPI. Thus, one should remain cautious about interpreting changes in the PPI as predictive towards how consumer prices develop.

The inflation outlook: PCE core inflation will settle above 2%

Based on this analysis, we have updated our US inflation outlook, which, overall, has been revised higher, see chart 26. We now expect PCE inflation to be 3.3% y/y this year and 2.5% y/y next year (PCE core inflation at 2.8% y/y this year and 2.6% y/y next year). We expect inflation to peak in November 2021 and that both headline and core PCE inflation will decline when base effects drop out in April 2022. In general, we expect inflation to

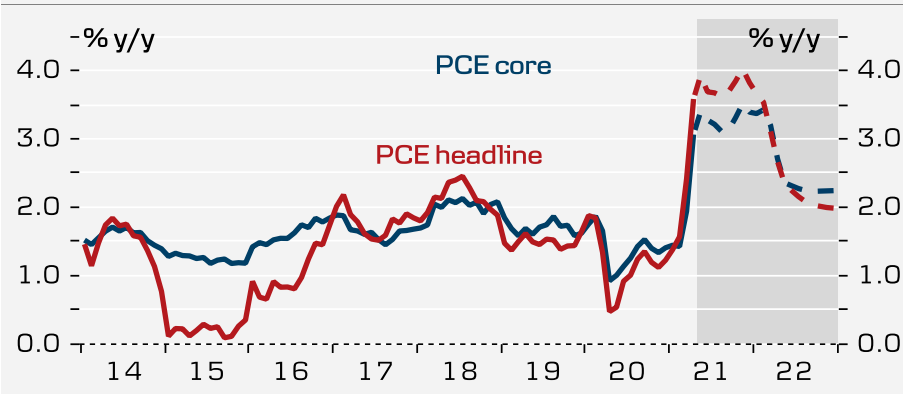
Chart 25: Historically, swings in PPI have not affected CPI core significantly



Sources: BEA, BLS, Macrobond Financial

settle at a higher level than before the pandemic due to higher inflation expectations, which means higher core services inflation. This should imply higher PCE core services inflation (excluding housing and health care) on a sustained basis. Both inflation in PCE housing and PCE health care (parts of PCE core services) are expected to be higher due to rising rent (supported by a warm housing market) and higher wage growth in health care (respectively). We expect PCE core goods inflation to slow starting in H2 21 due to a peak in USD and lower demand for goods when we get back to normal.

Chart 26: PCE core inflation is set to settle above 2% next year



Sources: BEA, Macrobond Financial, Danske Bank forecasts

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