Q-Series

Stagflation: How Likely, How Long, What's Priced, How to Protect?

Global Strategy

Global

Bhanu Baweja
Strategist
bhanu.baweja@ubs.com
+44-20-7568 6833

Nicolas Le Roux
Strategist
nicolas.le-roux@ubs.com
+44-20 7567 0161

Alan Detmeister
Economist
alan.detmeister@ubs.com
+1-212-713 1222

Anna Titareva
Economist
anna.titareva@ubs.com
+44-20-7568 5083

Keith Parker
Strategist
keith-j.parker@ubs.com
+1-212-713 3296

Niall MacLeod
Strategist
niall.macleod@ubs.com
+852-2971 6186

Jess Eagel
Strategist
jess.eagel@ubs.com
1-212-713-2000

Stagflation: Pressure, Pricing and Protection

Following up on our prior work on how Stagflation impacts markets, we present a new framework that tries to quantify how severe stagflationary pressures are, how long they might persist & what's priced in by equity markets. We use the best of top-down and bottom-up approaches to pick stagflation protection stocks in the US, EU, UK & APAC.

Pressure: How stagflation readings differ across countries & across time

We've built Stagflation Pressure Indices for 45 economies by combining 10 contemporaneous & forward-looking growth & inflation variables. These show stagflation pressures most elevated in Germany, US, Sweden, UK, Turkey & Russia while being low in Australia, Canada, China, Mexico & India. At 3.3 standard deviations, the US's Stagflation Pressure Index is not far from a 1970s peak of 5, but today's pressure will likely be much less persistent. Our model calculates it would take 29 months in the US & 20 months in Germany for today's stagflation pressure to halve. That compares with more than 10 years in the '70s.

Pricing: What probability do markets ascribe to Stagflation?

Stagflation is a process, not an acute event. We define it as a period where our Stagflation Pressure Index maintains a reading above 2.5 for a 12m spell. Using methodology employed in pricing VAR and One-Touch options, we assess the probability the market implies of this occurring over the next 3 years. S&P500 internals imply a 5% probability of stagflation. FTSE 250 prices in a 10% chance, while MSCI China prices in 5%. Eurostoxx 600 stands out, pricing in 25% probability of stagflation.

Protection: The best of top-down & bottom-up to build stagflation protection

In our top-down approach, we construct most/least favoured lists of stocks based on highest & lowest sensitivity to our country/region Stagflation Pressure Indices. Our bottom-up pricing power methodology screens for stocks with steadiest margins through adverse economic conditions. We then take the intersection of stocks selected by both approaches as our Stagflation Protection list. We've constructed these for the S&P500, Stoxx 600, FTSE 350 & MSCI APAC. See this spreadsheet to view the stocks.

Executive Summary

I: Quantifying Stagflationary Pressures

We have built Stagflation Pressure Indices for 45 countries by combining 10 contemporaneous & forward-looking growth & inflation variables. Our US Stagflation Pressure Index recorded a high of 5 standard deviations through the 1970s. Today, the US's reading is 3.3. At 4.2 in our panel, UK, Sweden and NZ are also at the upper end of the spectrum, while Australia & Canada are better placed due to stronger growth. In EM, stagflation pressures are high in Turkey, Russia, Chile, the Czech Republic & Brazil, and low in Indonesia, South Africa, Mexico and China.

II: How long are Stagflation pressures likely to last?

While many stagflation pressure index readings look very elevated today, they will likely not stay there. Our economics teams believe US inflation has already peaked and Europe's will do so by Sept '22. To supplement their fundamental outlook, we employ a metric of autoregressive sensitivity that estimates the time it would take any country's Stagflationary Pressure Index to reduce to 50% of its value, i.e., its half-life. We estimate this time at 29 months for the US (>10y in the 1970s), and 20m for Germany.

III: What probability of stagflation is the market pricing in?

Stagflation is not an acute event, it's a process. Based on the experience of the 1970s we define stagflation as a period where our Stagflation Pressure Index maintains a reading above 2.5 for a 12m period. Using methodology employed in pricing VAR and One-Touch options, we calculate the probability the market implies of this occurring over the next 3y. We find S&P500 internals implying a 5% probability of stagflation. That compares with it having priced nearly a 100% probability of it occurring just ahead of the first oil shock of the 1970s, 40% through the second oil shock. European equities imply a 25% probability of stagflation, the highest across regions. FTSE250 implies 10% and MSCI China implies 5% probability of stagflation. The latter is similar to that implied by S&P500, but is driven by weak growth, not higher inflation, as in the US.

IV: Designing stagflation protection: The best of top down & bottom-up

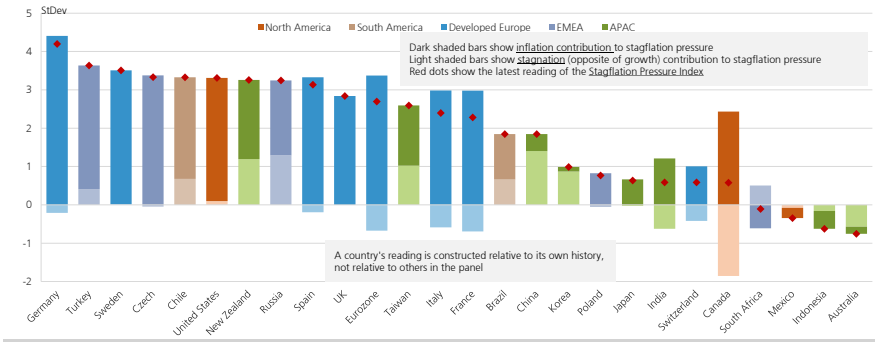
We've built two stagflation resistant stock lists using a) the macro Stagflation Pressure Indices and b) bottom up pricing power, respectively. In our first approach, we construct most favoured and least favoured lists of stocks that show the highest positive & negative sensitivity to our country/region stagflation indices, and which performed best in the fourth quartile of their country's Stagflation Pressure Index readings. Our second methodology looks for stocks whose margins show the highest sensitivity to inflation, the lowest sensitivity to weak growth & the lowest coefficient of variation over time. We then look for their intersection: the stocks selected by both these approaches. In this note we present these Stagflation Protection stock lists for the S&P500, Eurostoxx 600, FTSE 350 and MSCI APAC.

V: That's a lot of words & numbers for something that isn't our base case

We don't expect stagflation anywhere in our base case and see US CPI and EZ HICP ending 2022E at 4.8%y/y and 5.7% y/y, both roughly 200bps below what's priced in their respective inflation linker markets. However, inflation error bands are much wider than normal as it is being driven by processes which are hard to model. Worsening geopolitics could compromise the flow of natural gas from Russia to Europe, for instance, which could lead the market to reassess the probability of stagflation higher. The point of this paper is to develop real time measures of probability, pricing and protection against a poor growth-inflation mix persisting.

Executive Summary

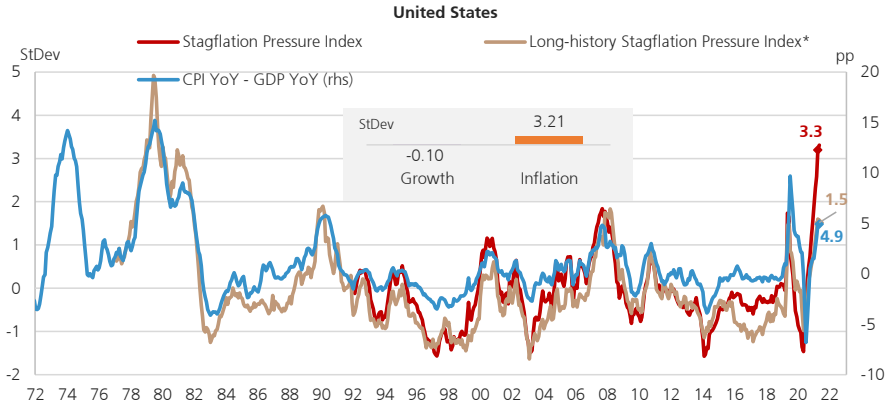
Figure 1: Inflation and Stagnation (inverse of growth) contribution to Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS

We have built Stagflation Pressure Indices for 45 economies by combining 10 contemporaneous & forward-looking growth & inflation variables. These show stagflation pressures most elevated in Germany, US, Sweden, NZ, UK, Turkey & Russia while being low in Australia, Canada, China, S Africa, Mexico & Indonesia. Stagflationary pressures are more pronounced in developed markets than in emerging markets today, particularly so in Asia. This could change if food prices remain high.

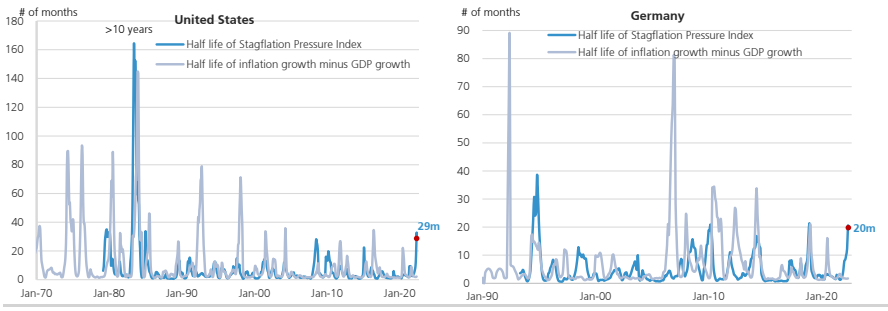
Figure 2: US Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices.

At 3.3 standard deviations relative to its history, the US Stagflation Pressure Index's reading today is not far from a 1970s peak reading of 5. But we can take the comparison with the 1970s only so far. Today's pressures are likely to be much less persistent than 50y back. Stagflation is not our base case view.

Figure 3: US and Germany Stagflation Pressure Indices' rolling half-life (estimated time for Stagflation Pressure Index value to halve)

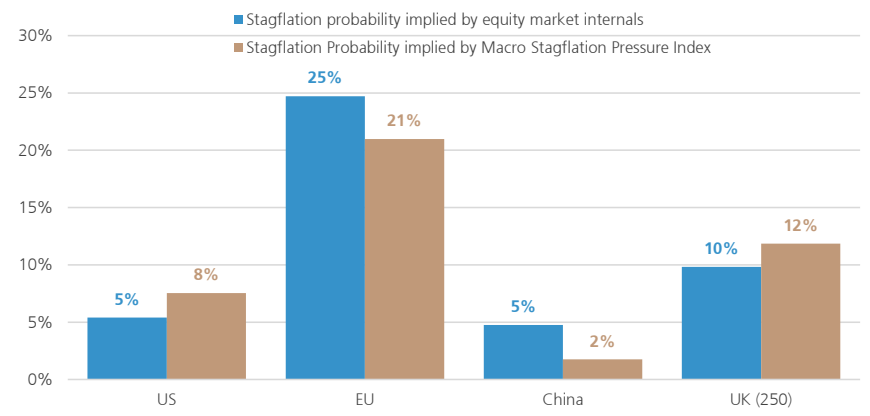


Source: MSCI, Datastream, Bloomberg, UBS

We calculate the time that will likely be taken for any country's Stagflation Pressure Index to halve (its half life), based on the inertia its components are displaying. Our model puts the US Stagflation Pressure Index's half life at 29 months compared with it having displayed a half-life of over 10y in the late 1970s / early 1980s. Germany's Stagflation Pressure Index's half-life (higher in level terms than US today) comes in lower, at 20 months. UBS's base case sees inflation pressure dissipate faster than implied by this half-life model

Executive Summary

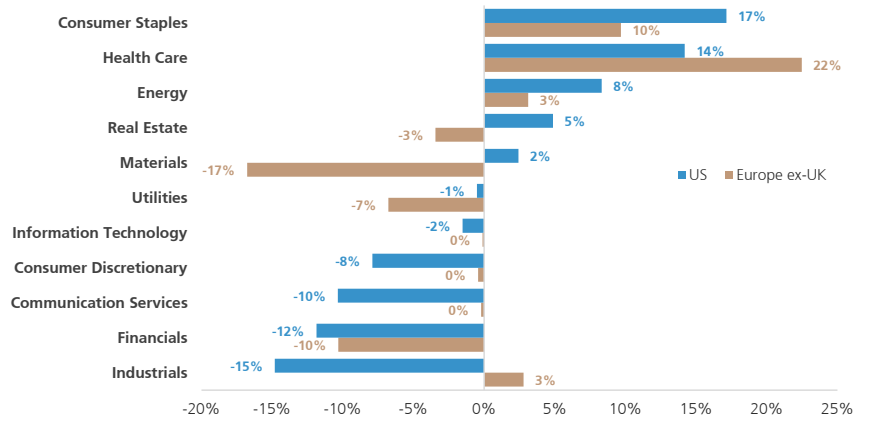
Figure 4: Stagflation probability implied by equity market internals and macro Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS

Stagflation is a process, not an acute event. We define it as period where our Stagflation Pressure Index maintains a reading above 2.5 for a 12m spell. Using methodology employed in pricing VAR and One-Touch options, we assess the probability the market implies of this occurring over the next 3y. S&P500 internals imply a 5% probability of stagflation. FTSE 250 prices in a 10% chance while MSCI China prices in 5%. Eurostoxx 600 stands out, pricing in 25% probability of stagflation

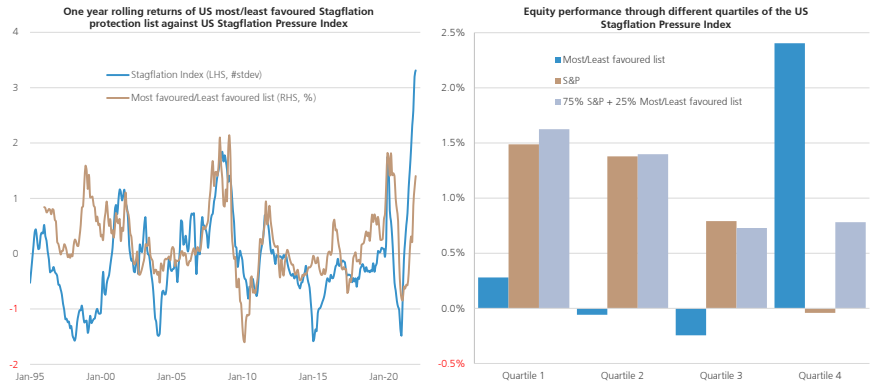
Figure 5: Sector allocation that emerges from the Stagflation Protection stock selection. See stock lists in this spreadsheet.



Source: MSCI, Datastream, Bloomberg, UBS

We use stocks selected by both top down and bottom up approaches as our Stagflation Protection list (see spreadsheet). This figure shows the sector allocation implied by this list. The Stagflation Protection list is overweight Staples, Healthcare & Energy and underweight Financials in both the S&P500 and Stoxx 600. It leans positively on Materials and Real Estate and negatively on Consumer Discretionary in the US, but not so in Europe, where it is more positively weighed to defensive Industrials (Aerospace) and negatively towards Materials

Figure 6: One-year rolling returns of the most/least favoured lists versus our stagflation index, S&P Average monthly returns



Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

The first chart in this panel shows how our S&P500 Stagflation Protection stock list tracks US stagflationary pressures. The tight fit is driven more by the less favoured part of stock selection than the more favoured part. This means, in preserving portfolio value through stagflation, it may be more important to get right what to avoid than what to buy. The second chart in the panel shows that a 75%-25% combination of the S&P500 and our Stagflation Protection stock list has done well through all 4 quartiles of stagflation pressure

Section I: The Stagflation Pressure Index

How we measure Stagflation Pressure

We start by constructing separate Growth and Inflation indices per country

In order to build stock lists that can protect against stagflation risks, we first need to measure how elevated these pressure are, how they sit relative to history, and how they are likely to evolve. To this end we have built stagflation pressure indices across countries. We do this by building separate Growth and Inflation indices per country and then combining them into a Stagflation Pressure Index (SPI) for that country.

These are built using both forward looking and contemporaneous variables

We first build a **Growth Index** per country based on the following variables:

1. Expected GDP Growth
2. PMI Manufacturing
3. Retail sales
4. Industrial production
5. Consumer confidence
6. Business confidence

Next we build an **Inflation Index** per country based on the following variables:

7. Expected CPI
8. Core CPI
9. PPI
10. Labour Costs

Our Growth and Inflation Indices allow us to analyse stock sensitivities to recession/rebound and inflation as well

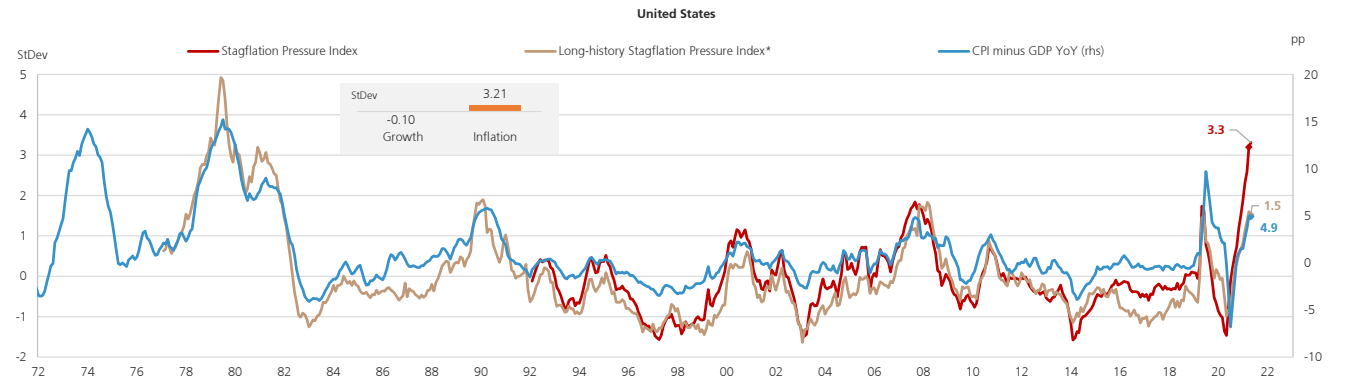
We standardise these variables with their volatility respectively, and then reduce their dimensionality to create single Growth and Inflation indices per country. We then combine these into a **Stagflation Pressure Index (SPI)** for the country. The reading denotes how many standard deviations the stagflationary pressure today is from a long term average. This note focusses on stagflation, but the Growth and Inflation Indices allow us to run numbers on the probability, pricing and stock list construction for recession and rebound as well.

We extend our index back based on (fewer) data variables that were available. This is the long history Stagflation Pressure Index. We also compare it to a simple inflation - growth proxy for stagflation

Most of our Stagflation Pressure Indices begin from in the late 1990s/early2000s, since when all 10 variables above are available. We've also built two additional indices to better compare today's values with readings further back in time. We've constructed 'Long History Stagflation Pressure Indices, which are based on (fewer) variables that were available through history (no retail sales and consumer confidence available for the US before 1993, for instance).

Lastly, we compare the trends in these two Stagflation Pressure Indices with a simple Inflation – GDP growth proxy of stagflationary pressures per country. Note that most of the variance of the simple Inflation - GDP growth metric is driven by inflation. However, in our Stagflation Pressure Indices, we standardise growth and inflation variables by their historical volatility, so the contribution of growth and inflation to our SPI is broadly similar.

Figure 7: US Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS. Note: based on fewer variables to construct growth, inflation and stagflation indices.

The US Stagflationary Pressure Index is at 3.3 standard deviations today, not far from a 5 standard deviations reading for the late 1970s/early 1980s (Figure 7). As a base case, we expect today's shock to be much shorter lived than in the 1970s as supply driven inflation comes off before a wage price spiral can be formed (see Part II for details). Even if we're right on inflation, however, we still have to monitor the impact of monetary & fiscal tightening on growth. Our Stagflation Pressure Index will help mark expectations to reality.

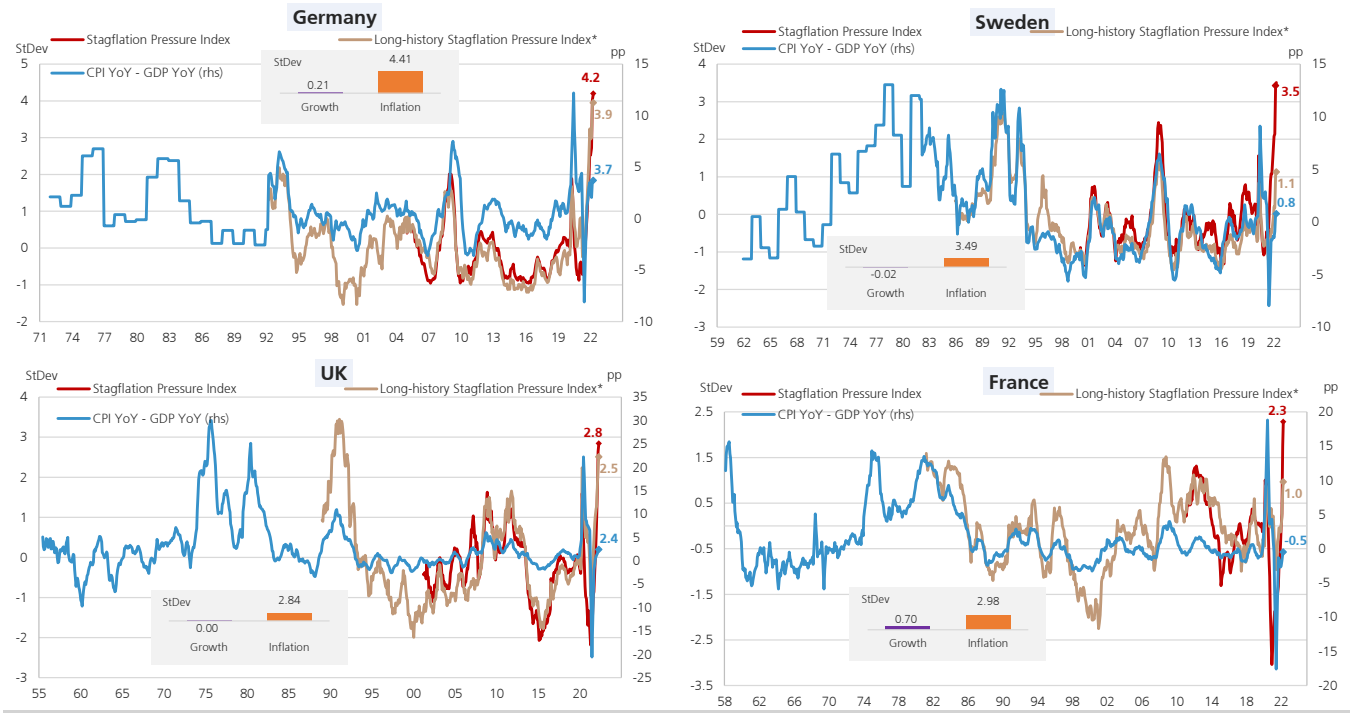
US's Stagflationary Pressure Index reading of 3.3 is not far from its peak reading of 5 in the 1970s. But we believe it will revert lower quicker this time.

Stagflation Pressure Indices for 14 countries (further 30 in the appendix)

When looking at these charts please bear in mind that the Stagflationary Pressure Index score for an individual country is constructed by comparing its growth and inflation variables to its own history, not that of the whole panel. That is what matters for markets in a country. Investors in 31% PPI inflation Germany will find little consolation in the fact that PPI inflation in Turkey is running at 122%. Later in this section we make adjustments to our current scores to present a more valid comparative-static picture (Figure 11). But, before that, here is how Stagflationary Pressure stacks up for individual markets (Figure 8 through Figure 11).

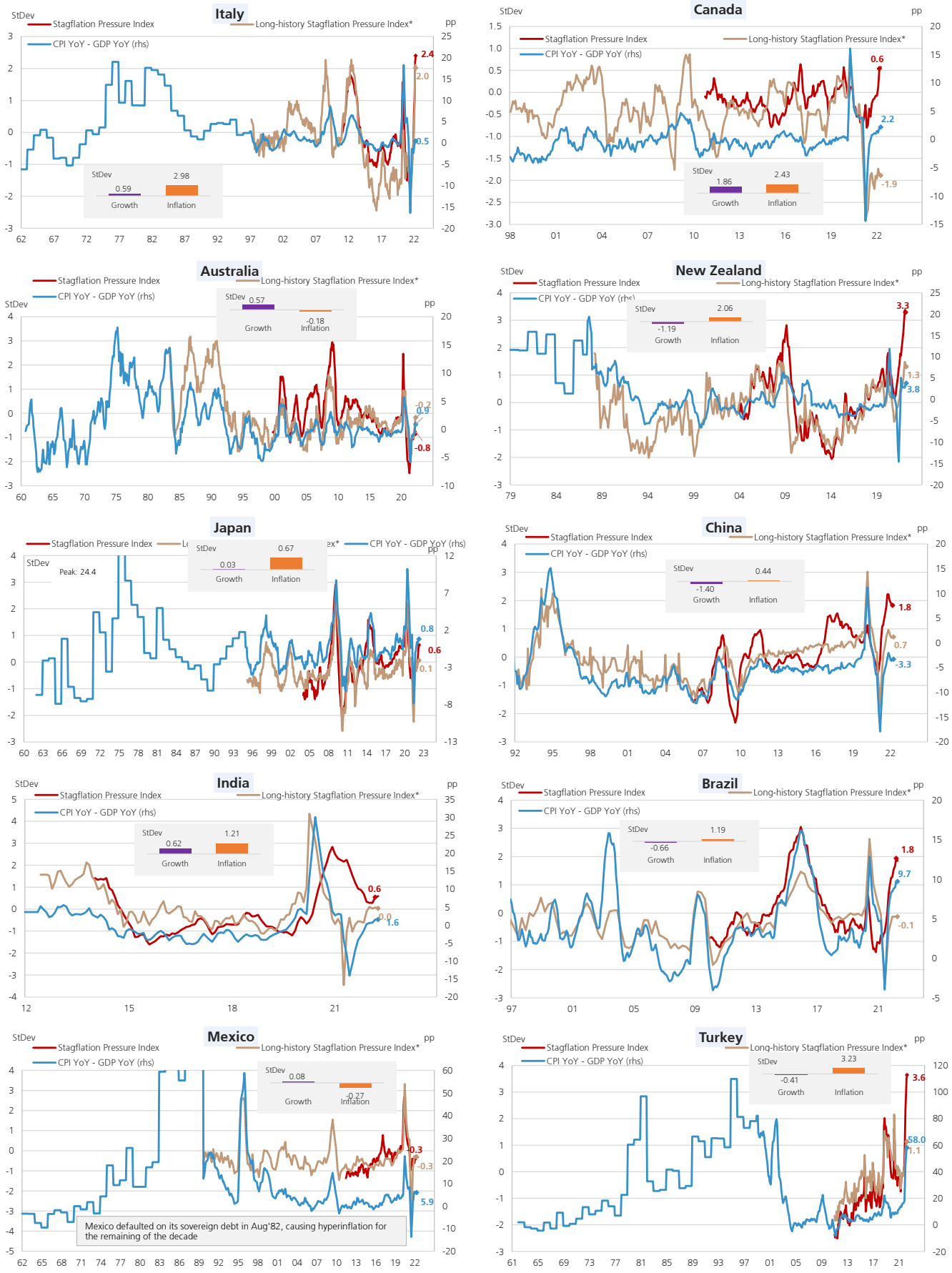
Stagflation Pressure Index for a country scores a country's pressures relative its own history, not that of the whole panel of countries.

Figure 8: Stagflation Pressure Indices for 14 countries



Source: MSCI, Datastream, Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices.

Figure 9: Stagflation Pressure Indices for 14 countries (Cont'd)



Source: MSCI, Datastream, Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices.

Pressures are more elevated in DM than EM today, but this can change

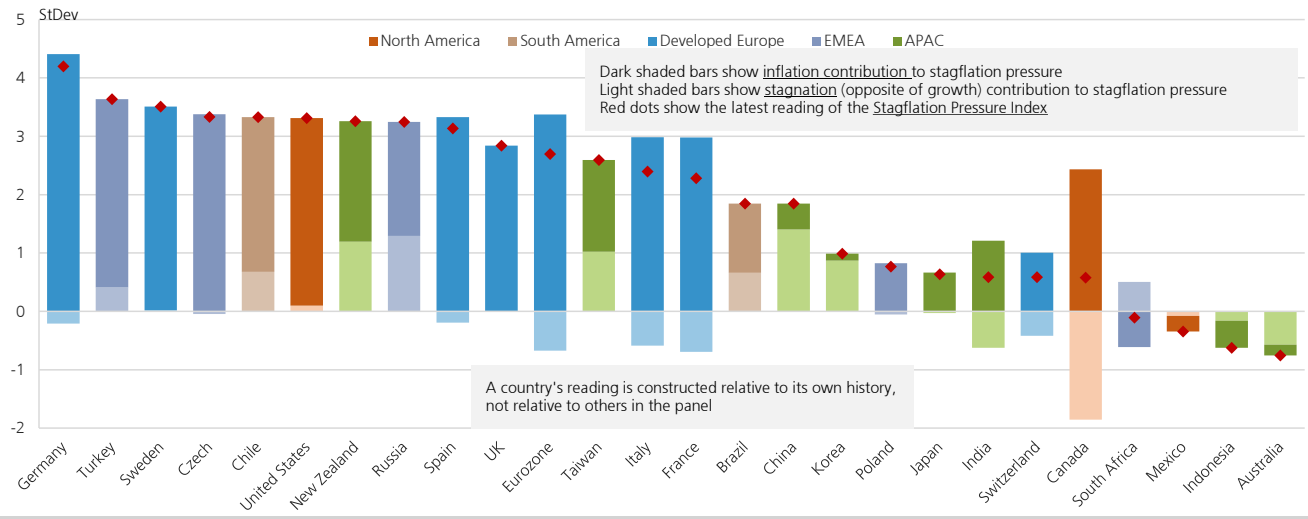
Germany, Sweden, US, NZ, UK, Russia, Turkey, Czech R and Chile see most elevated stagflation pressures

It's developed markets where the Stagflation Pressure Index is elevated today, nowhere more so than Germany, the highest reading in our entire panel. Sweden, US, NZ , Spain also occupy the upper end of the spectrum. Within G10, our model records lowest stagflationary pressure in Canada, Switzerland and Australia. This is because growth here is much higher than its historical averages compared to inflation (Figure 10). Russia, Turkey, Czech Republic and Chile show the most elevated readings in the emerging world while China and Brazil see moderate stagflationary pressures. China's stagflation print is more about weak growth while Brazil's is more about high inflation. In fact, China's growth reading is the weakest volatility adjusted reading of the entire sample (Figure 10).

EM inflation (and stagflation) pressures muted today, but need to keep an eye on food prices

The Stagflation Pressure Index appears lower today in some EM economies like India, Mexico, South Africa and Indonesia than may be expected. This is partly because they are they enjoying a belated reopening boost and partly because inflation readings are still within historical ranges (which are themselves very wide). This can change, though. Commodity prices take time to translate into retail prices in EM, and output gaps, which are still open in several EM, will slowly close. The biggest risk for EM will be energy and food inflation persisting, and spreading through core components as well. On the whole, though, today stagflationary pressures are limited in EM, particularly so in Asia (economies like Sri Lanka and Pakistan are exceptions).

Figure 10: Inflation and Stagnation (inverse of growth) contribution to Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS

Wait! Sweden showing similar stagflation pressure as Turkey? China the same as Brazil? Can that be right?

Again, if you are doing a double take on Sweden showing similar stagflation pressure reading as Turkey, its because we construct a pressure index for a country based on its own historical data, not that of the whole sample. Figure 10above puts stagflation pressures in individual countries today in their own historical context (a comparison over time). It is less useful in comparing today's pressures across different countries (a comparison across space). Brazil isn't as dislocated from its stagflation history today as Sweden is from its history.

But there should be a way to compare across countries as well. We turn to that next.

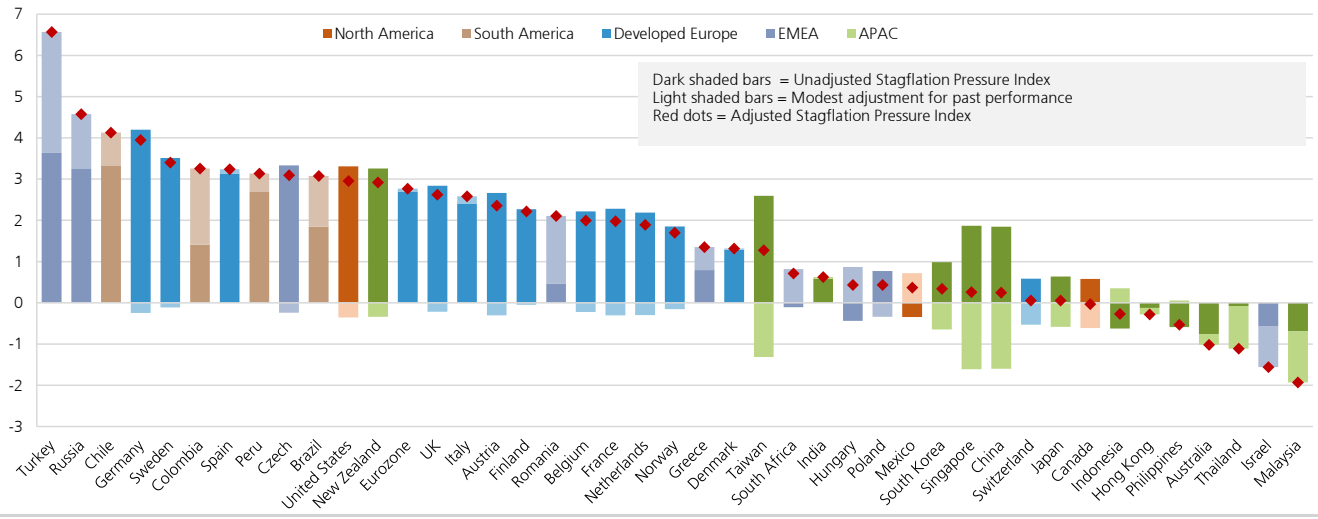
An adjustment in Stagflation Pressure Indices to make cross country comparisons

To make cross country comparisons we shift our individual stagflation pressure readings by the gap between long term averages of stagflationary pressures of the country in question and to long term average of the whole panel

When the purpose of the analysis is not comparing how today's pressures in a country sit relative to their history, but to compare today's pressures across countries, we make adjustments to our current scores to account for stagflationary history in a particular country. A low reading of Stagflationary Pressure may not imply low probability of future inflation if historically the country has frequently reverted to a poor growth-inflation mix (think Brazil, S Africa). When we present a comparative static picture of stagflationary pressures across countries in (Figure 11) we shift our individual stagflation pressure readings by the gap between long term median (using average instead of median would

penalise EM much more) of stagflationary pressures of the country in question relative to that of the whole sample. In a sense, in order to make the comparison more valid, we are making a **modest adjustment** in today's stagflation pressure readings lower for good performance historically, and higher for poor performance historically. A weakness of this approach is that it will wrongly penalise countries whose growth inflation mix has been structurally improving after having been poor historically.

Figure 11: Adjusted (for past performance) Stagflation Pressure Indices: A truer comparative static picture



Source: MSCI, Datastream, Bloomberg, UBS

Box: A laboratory of the Stagflation thesis: United Kingdom

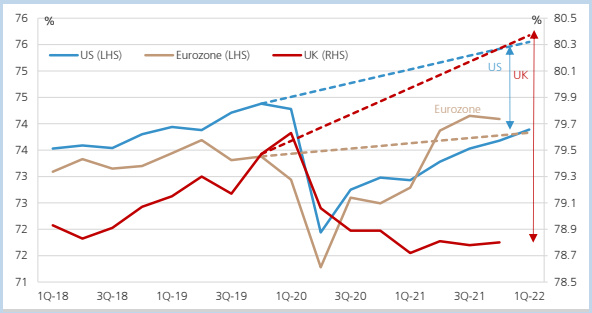
The UK's reading on our Stagflation Pressure Index is high, but not an extreme one today. Yet, while some of the extreme readings like Germany can ease over time as the energy shock dissipates, stagflationary pressures could persist for longer in the UK. Its current readings of stagflation pressure would be worse were it not for the fact that it has suffered a poorer historical growth-inflation mix than most other DM. Greater historical volatility scales down the degree of today's shock.

The UK economy has not enjoyed the same degree of of fiscal stimulus/benefits as the US, so demand has been less hot comparably. Also, UK's dependence on Russia for its oil and gas supplies is smaller compared to Germany or Italy, so the supply shock from energy should be less severe than most of Europe. Yet, UK's inflation expectations remain higher than in the US and Eurozone (Figure 14).

This is partly because because being a small open economy it is exposed to every bump along the supply chain. But is also because in Brexit it is has suffered an idiosyncratic, and as yet poorly measured, leftward shift of the labour supply curve. UK's labour participation rate has fallen more than the US's since Covid-19 began (Figure 12). From a growth perspective, in addition to inflation and taxes eating into real household consumption (still below pre-Covid trend, unlike the US) there is also the risk that higher interest rates exert greater downward pressure on housing in the UK than in many other OECD economies. The loan to value ratio in the UK housing market is among the highest in the group (Figure 13). Even though the proportion of floating rate mortgages is very low, the overwhelming majority of mortgages are fixed for only up up to 5y, not 15-20y. Through reopening the services economy has remained robust, but the risk is that as pent up demand is exhausted, growth headwinds become very apparent.

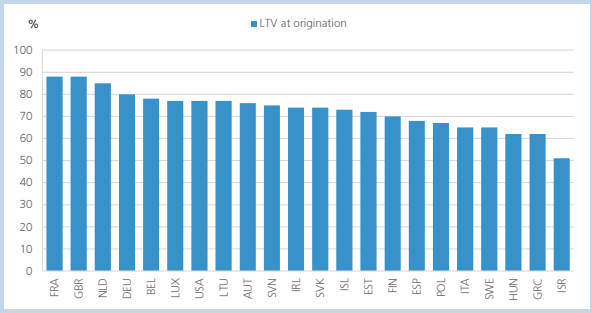
It is unsurprising that the BoE is priced for most cuts in G10 on the 2-5y horizon (Figure 15). The more domestically oriented FTSE 250 has been underperforming European stocks for the better part of 18months and we expect this trend to continue. We regard the UK as the laboratory or a weathervane of the stagflation thesis. If stagflation were to be realised in G10 economies (again, it's not our base case), we believe the UK would be among the first few to feel the brunt of it.

Figure 12: Participation rate in UK, EZ and US



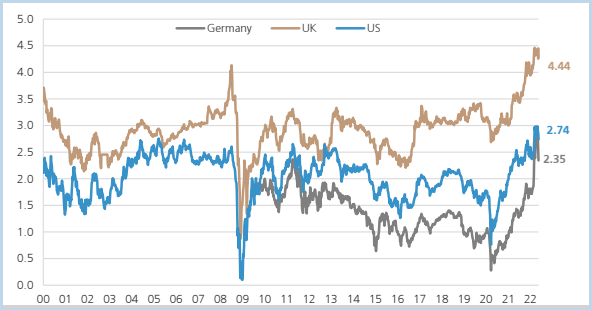
Source: Haver, UBS

Figure 13: Housing Loan to Value ratios in OECD countries



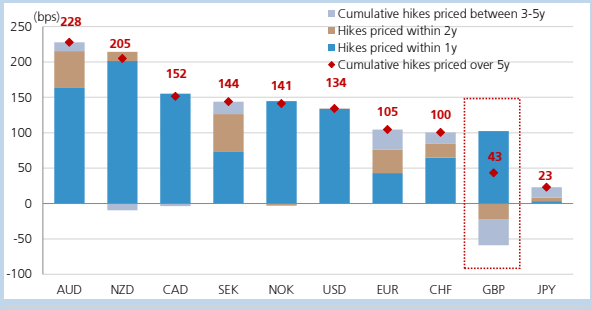
Source: OECD, UBS

Figure 14: 10 year inflation breakeven rates



Source: Bloomberg, UBS

Figure 15: Central Bank rate moves priced: fewer cuts priced further out now



Source: Bloomberg, UBS

Section II: How long is Stagflationary Pressure likely to last?

We tackle this question in two ways. First, **fundamental**: the call from our economics team. Second, **statistical**: by analysing the half-life of the current Stagflationary Pressure Index and placing this in the historical context.

Fundamental: How quickly will US inflation slow?

In our projection, US CPI inflation slows from the current 8.3% to 5.2% while core PCE inflation slows from 5.2% to 2.9% in the 4th quarter of this year. This is more slowing than the market or consensus expects. Why do we see inflation falling so sharply?

We expect US CPI at 5.2% y/y by Q4' 22E, down 300bps from the April print

1. Current crude oil futures prices imply declining gasoline prices over the remainder of the year, accounting for about 1¼ pp of the 3pp slowing in CPI inflation. If, instead, crude oil prices only hold at their current level ($106pb) the contribution of energy to CPI inflation would likely fall from a little over 2pp currently to 1.5 pp by December, slightly less than half of the slowing based on the current futures curve. Every $10 pb increase in crude prices adds roughly 40bp to the CPI.

Oil will contribute less to y/y CPI even if it stays here. We assume it will fall in line with the futures curve.

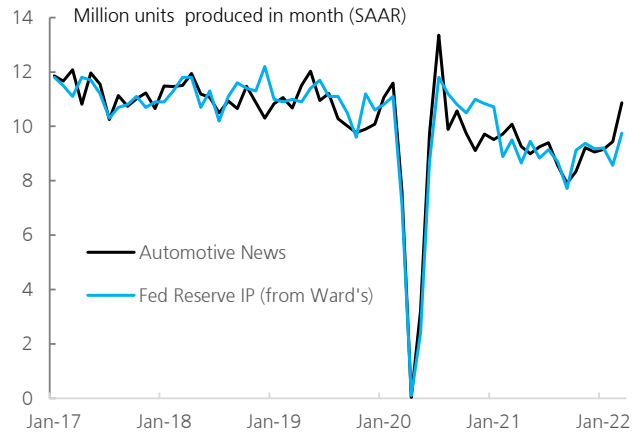
2. Motor vehicles have contributed substantially to the surge in inflation adding roughly 1¼pp to current CPI inflation and a little more than ¾pp to core PCE inflation. However, vehicle production is increasing solidly (Figure 16) and as a result motor vehicle prices will likely swing from a significant positive contributor to inflation to a modestly negative contributor by the fourth quarter if production gains continue. Rotating demand from goods to services should re-align demand with the production and distribution infrastructure and therefore be disinflationary.

Used cars prices should fall, as should broader core goods inflation

3. Increased labour force participation and reduced absenteeism are slowing wage growth pressures (Figure 17) and expanding capacity to supply the additional demand for services without surging services inflation.

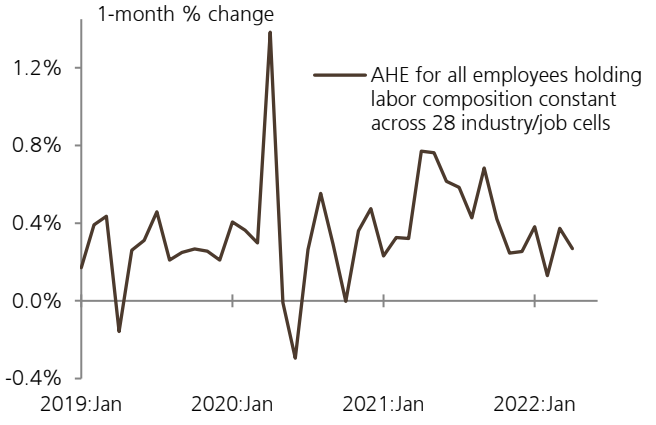
Improving participation rates should cap wage increases

Figure 16: US vehicle production is picking up



Source: Federal Reserve, Automotive News, UBS

Figure 17: The monthly pace of hourly wage growth has slowed since the middle of last year



Source: Constructed by UBS using BLS data

4. The largest increases in inflation have been among items where inflation has tended to have little or no persistence. (Figure 18) This means that overall inflation is likely to come down more rapidly than might be expected by those looking only at the aggregate data.

Additionally, a couple of other factors that some may expect to drive up inflation we think will have only a minor impact:

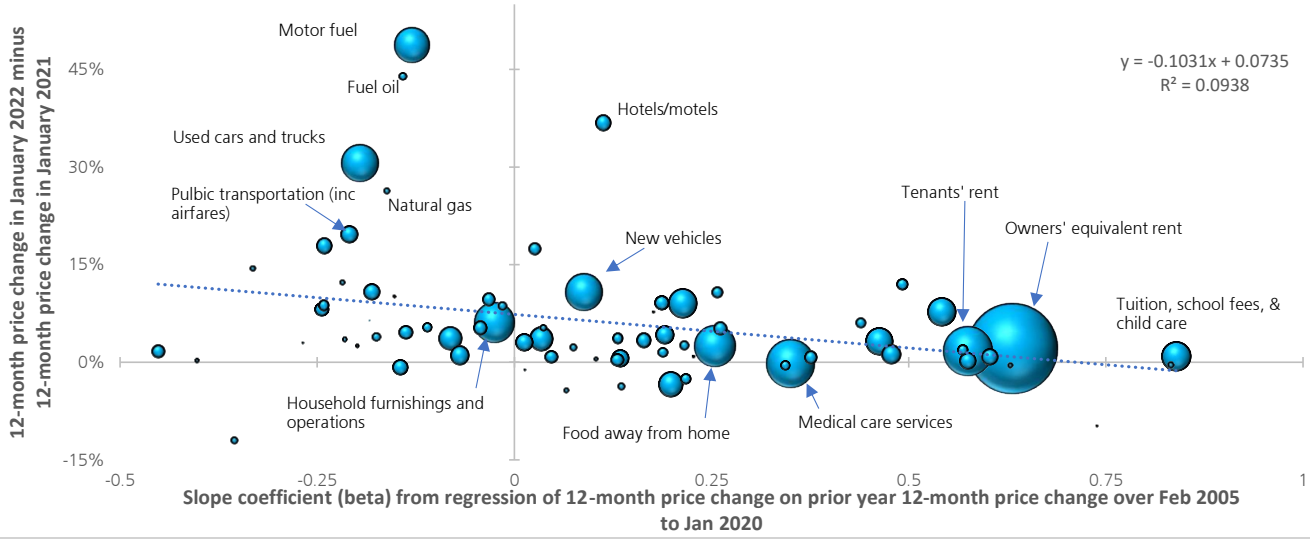
5. Food prices account for only a fairly small share of consumption (food at home share is about 8½% of the CPI basket) and commodity prices account for only a small share of most US food items (for example, the USDA estimate that wheat costs account for only about 4% of the retail price of a loaf of bread). As a result we think the roughly 25% surge in food commodity prices since the start of the year will result in food contributing only about 11bp more to CPI inflation by the end of the year above its current 83bp contribution.

Given its low weight, the contribution of food to overall CPI is likely to be limited even after the 25% rise in food commodity prices

6. CPI rent prices are projected to continue to rise strongly, but monthly increases in rents for leases by new tenants peaked in the middle of last year and have slowed sharply in recent months. The lead from rents for leases by new tenants to the CPI suggests that owners' equivalent rent in the CPI and PCE prices are at or near their peak and will likely see little to no further pickup beyond the 40 to 45 bp range of monthly increases seen since September.

Run rate of rental inflation is peaking

Figure 18: Inflation has risen most strongly in components with little inflation persistence



Source: BLS, UBS

Fundamental: How quickly will Eurozone inflation slow?

We previously expected Eurozone headline inflation to peak at 8% y/y in June. However, a combination of the recent agreement between Spain, Portugal and the European Commission to temporarily cap wholesale gas prices (expected to come into force in May) is likely to take some pressure off electricity prices and the temporary fuel tax cut in Germany (effective in June) is likely to lead to a lower inflation contribution of energy over the next few months. At the same time, the expiry of temporary fuel tax cuts and rebates (Spain in June, France in July, Germany in September) and rising food prices imply that despite the lower inflation peak (7.8% y/y in May), headline inflation is likely to stay high for longer. All combined, we now expect Eurozone inflation to hover above 7% until September before returning to 2% in Q2-23 (Figure 19).

HICP stays above 7% y/y till September, but then returns to 2% by Q2 2023E

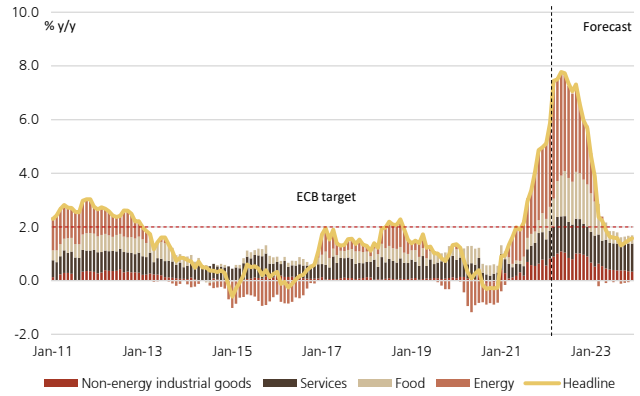
Overall we forecast inflation to average 6.8% in 2022E and 2.1% in 2023E. we are paying particular attention to Eurozone wage growth. While Eurozone-negotiated wage growth (1.9% y/y in March) has so far remained below its pre-Covid peak of 2.5%, there are now signs of a pick-up, and we expect a further rise in H2 that should push negotiated wage growth to c.3% by end-2023E (Figure 20 and Figure 21).

We forecast inflation to average 6.8% in 2022E and 2.1% in 2023E, but risks, both near and medium term, are skewed to the upside

The sharp rise in inflation in recent months has led to a dramatic decline in real wage growth (-5.5% y/y in March), which we think will lead to more contested wage rounds this year (Figure 22). In this context, German wage negotiations (covering around 22% of employees this year) will be key, most importantly those in the metals industry in September 2022 (covering 9% of employees) (link, link).

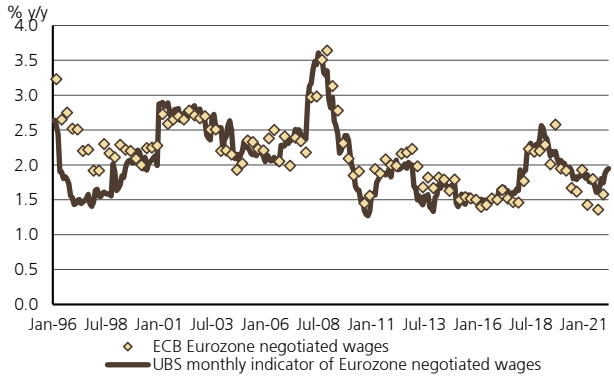
Wage growth is key for the medium-term outlook

Figure 19: Eurozone inflation – component contributions



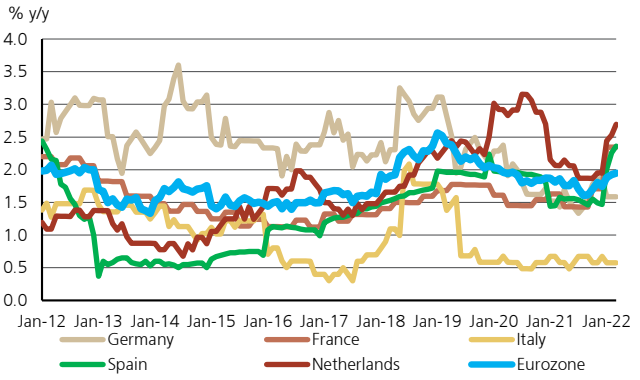
Source: Haver, UBS estimates

Figure 20: Eurozone negotiated wages



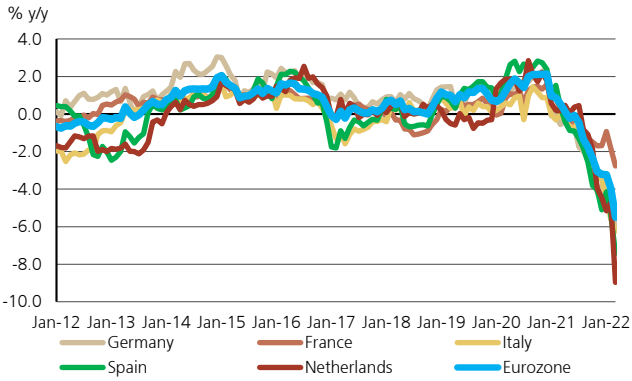
Source: ECB, Haver and UBS calculations

Figure 21: Eurozone nominal negotiated wages – country breakdown



Source: Haver and UBS calculations

Figure 22: Eurozone real negotiated wages – country breakdown



Source: Haver and UBS calculations

In summary, on a fundamental view we see US inflation declining from 8.3% y/y currently to 2.3% y/y by end '23E and European inflation declining from 7.5% y/y currently to 1.6% by end '23E. Even if we assumed Growth Indices remained unchanged at today's weak levels these declines in US and European inflation would imply a fall in the US Stagflation Pressure score from 3.3 to 0 while Europe's score would fall from 2.7 to 0.1.

Our base case sees Stagflation Pressure Indices for US and Europe close to 0 by end '23E

Statistical: How quickly will stagflation pressure fade? Estimating the Half Life of Stagflation Pressure Indices

Next, we tackle the same question of 'how long stagflation lasts' based purely on statistical techniques. We analyse the degree of inertia or persistence in our Stagflation Index readings. We measure the intensity of autoregressive behaviour in the combination of our sub indices of inflation and growth to understand how quickly the series is likely to revert to the mean.

A high Stagflation Pressure Index reading, but very likely not comparable to the 1970s in terms of persistence

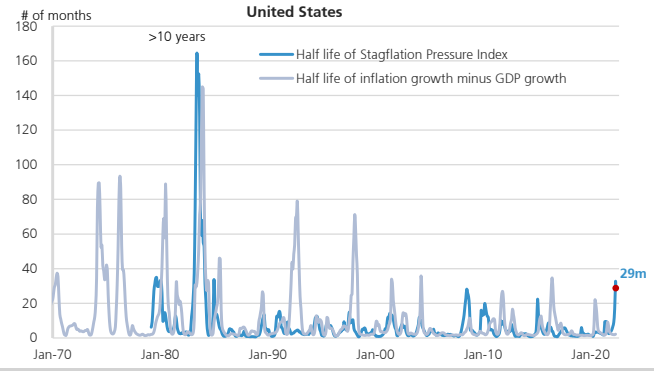
We find that while the level of Stagflation Pressure Index in the US is not far from that of the 1970s (3.3 today vs 5 peak in the 1970s), there are signs that its persistence is likely to be much lower in this episode. We measure persistence in half life, a concept borrowed from physics, which measures the time taken for half the atoms in a radioactive isotope to decay. In our context, we measure it is as the time taken for our Stagflation Pressure Index to reach half its value.

We measure the half life of our Stagflation Pressure Indices: a measure of their autoregressive tendency

The calculations are very sensitive to the time window over they are conducted. Ideally, we would like to take up to a minimum of 5 years rolling time windows to conduct this exercise, but that would risk missing the burst in inflation which has begun in H2 2020 and accelerated from March 2021. We therefore take a 12 month rolling window to

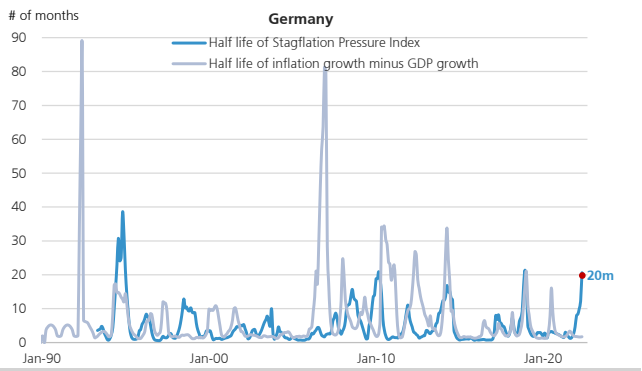
conduct this half-life analysis. See the appendix for a methodology of the half life analysis.

Figure 23: Half Life (time taken for index to halve): US Stagflation Pressure Index and Inflation - GDP proxy



Source: MSCI, Datastream, Bloomberg, UBS

Figure 24: Half Life (time taken for index to halve): German Stagflation Pressure Index and Inflation - GDP proxy



Source: MSCI, Datastream, Bloomberg, UBS

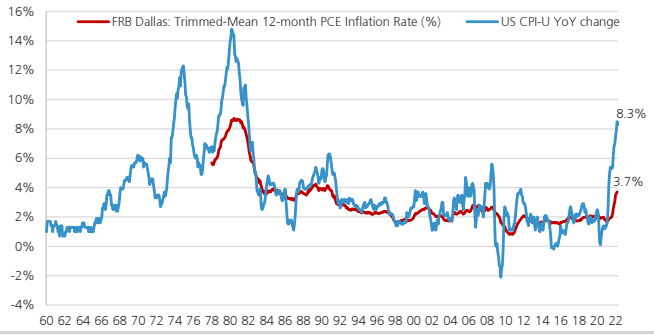
Our model shows that in the US, Stagflation Pressure Index half life presently is at 29 months compared with a half life of over 120 months for the US index in the late 1970s / early 1980s (Figure 23). We compute the half life for Germany Stagflation Pressure Index at 20 months compared to a half life of 40 months seen in the early 1990s, post the unification (Figure 24). So, in the US, the degree of Stagflation persistence is a fraction of its previous peak (late 1970s) while in German stagflationary pressure's persistence is roughly half of its previous peak (early 1990s).

US Stagflation Pressure Index half life is presently at 29m compared to >120m in the 1970s Stagflation. German Stagflation half life is at 20m today compared to 40m in the early 1990s after unification.

Bottom line, while Stagflationary Pressure are almost comparable to the 1970s in terms of their magnitude, they will very likely not be comparable in term of their persistence.

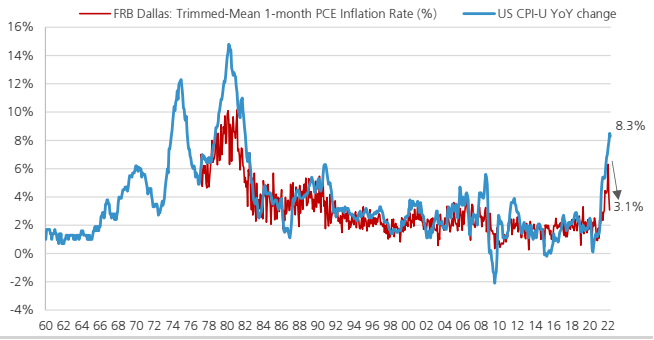
This is not something we can be absolutely certain about, but we do think there is a strong case to be made in favour of stagflationary pressures non persisting. Product and factor market pricing is much more flexible today than in the 1970s, allowing markets to clear quicker, the intensity of oil, food and commodity use is much lower, leading to lower weights for these goods in CPI baskets than in the past.

Figure 25: FRB Dallas 12m trimmed mean PCE and US CPI YoY



Source: Haver, UBS. Note: for CPI -U, 1982-1984 = 100

Figure 26: FRB Dallas 1m trimmed mean PCE and US CPI YoY



Source: Haver, UBS. Note: for CPI -U, 1982-1984 = 100

Perhaps most importantly, and as we have also argued in the fundamental view section above, inflation pressures today are much more concentrated in certain items within the CPI basket than in the late 70s/early 80s, and these items are not ones that show strong autoregressive properties or persistence.

Two important facts : 1) Inflation pressures seem less broad than history. 2) High inflation is being recorded in categories which haven't historically shown persistence.

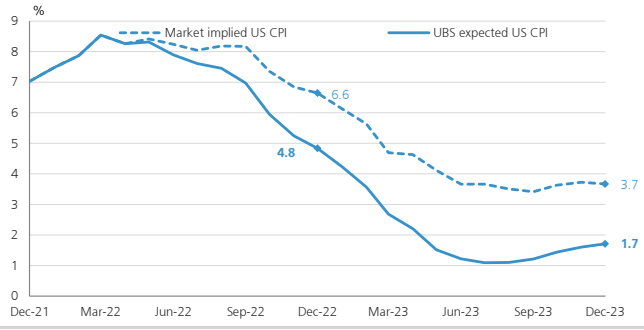
The Dallas Fed trimmed mean measure of PCE inflation, which excludes the components of PCE that experience the most extreme prices rises and falls, shows a much less inflationary central tendency of the PCE basket than in the 1970s/80s. Once the excessive price rises in (less intertial) items like used cars, rents and energy are behind us,

inflation, and stagflation pressures should be falling rapidly (Figure 27), (Figure 28).

So, both fundamental and statistical assessments suggest we should regard stagflation pressures as temporary.

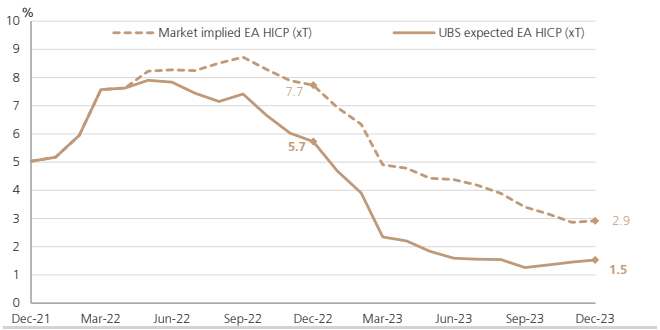
But there is no denying that inflation risks are skewed to the upside. Inflation is being driven by variables (energy, supply bottlenecks) that are difficult to model. Geopolitical risks have already done and may continue to prove our base case wrong. The TIPS market already disagrees with our inflation view, and the disagreement could rise if oil or natural gas prices rise further. The main stagflationary risk is the flow of energy from Russia to Europe being cut off. A possible embargo by Europe on oil imports from Russia can result in an embargo by Russia on its exports of natural gas to Europe. Russia's insistence for RUB payments for its energy exports can be the pretext that causes such a cut off in energy exports. The risks are high, then. To what extent are these risks already priced in the market's stagflation assessment? We turn to this next.

Figure 27: US: market implied CPI vs UBS expectations



Source: Bloomberg, UBS estimates, UBS

Figure 28: Europe: market implied CPI vs UBS expectations



Source: Bloomberg, UBS estimates, UBS

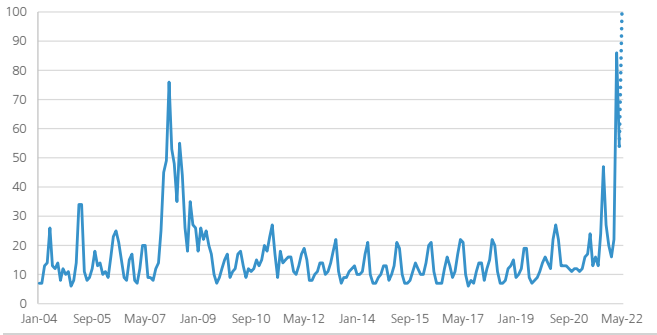
Section III: What probability of Stagflation is the Market Pricing?

Stagflation: A gap between market narrative and market pricing

Google searches for stagflation are at the highest level since data began in '04 (Figure 29) confirming its centrality in the investment narrative. However, while nobody needs convincing on the inflation risk to portfolios, market prices don't reflect recession worries: fixed income curves have fewer future cuts priced (Figure 15), credit markets see the ratio of HY to IG spreads not far from all-time tights (Figure 30), and cyclicals trade expensive relative to defensives across most regions, Europe a clear exception here.

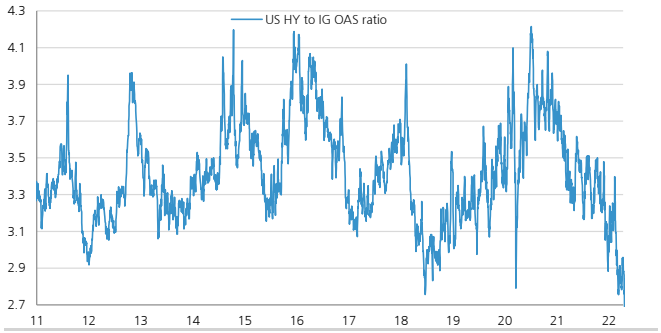
The message across assets is the same: markets are worried about inflation but not worried about recession

Figure 29: Google search trend for stagflation



Source: Google trends, UBS. Note: A value of 100 is the peak popularity for the term.

Figure 30: Ratio of US HY to IG OAS



Source: Bloomberg, UBS

Looking for stagflation pricing in equity market internals

For the rest of this section we will focus on the message from equity markets. We will use two statistical techniques to back out what probability of stagflation their internals are implying. This is how we go about it.

1) **First, we precisely define a Stagflationary condition** whose probability we seek from the market. Stagflation is not an acute event, it's a process. A Stagflation Pressure Index reading of 2 that persists for 6m must imply a greater probability of stagflation than a score of 4 that fades in a month. Based on the experience of the 1970s, we define stagflation as period where our Stagflation Pressure Index maintains a reading above 2.5 for a 12m spell through a 3y window.

We first define stagflation

2) **Second, we look for a most-least favoured selection of stocks that respond to Stagflation pressures.** We go into detail on this in the next section but, briefly, in order to get this selection we seek a) stocks that are most positively and negatively elastic to our stagflation indices, and b) stocks that display strong pricing power vs those that don't. We then take the stocks selected respectively as most and least favoured by both criteria as the lists to work with.

We then select a list of stocks that respond to our Stagflation Pressure Index

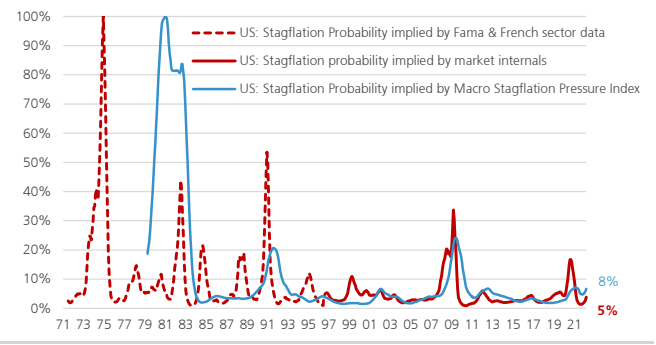
3) **Third, from this most-least favoured list we back out market implied Stagflation Pressure Index reading** using the current pricing of these Stagflation most-least favoured selection of stocks.

Next, we back out a market implied reading of each country's Stagflationary Pressure Index

4) **Fourth, we use two techniques to price Value at Risk (VAR) and One-touch options to calculate the probability of stagflation** from a) the market implied Stagflation Pressure Index and b) macro data based Stagflation Pressure Indices. The details of both methodologies are laid out in the appendix of this publication. We take the average of the results from two methodologies as our final stagflation probability implied by the market and macro data.

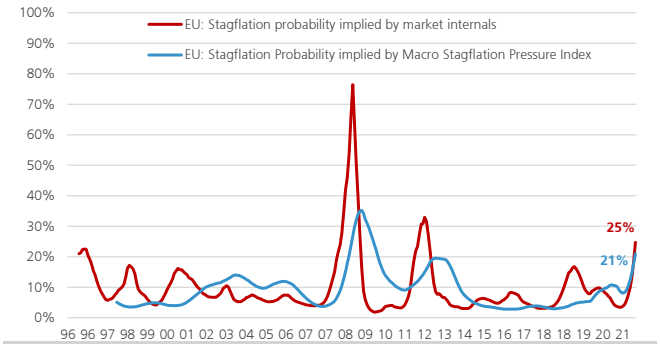
Lastly, we look for probabilities that a) the macro Stagflation Pressure Indices & b) the market implied Stagflation Pressure Index will meet the Stagflation condition

Figure 31: US stagflation: Macro data and market implied probability



Source: MSCI, Datastream, Bloomberg, UBS

Figure 32: EU stagflation: Macro data and market implied probability



Source: MSCI, Datastream, Bloomberg, UBS

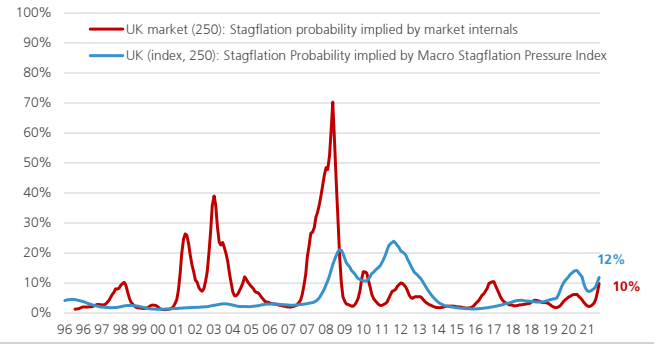
We conclude that the S&P500 internals are currently pricing in a 5% probability of stagflation (Figure 31). For context, this number just got close to pricing 40% probability of stagflation through the GFC (likely wasn't higher because the GFC was soon regarded as a disinflationary event). We use Fama and French industry pricing data to understand what the markets priced through the 1970s. Based on this dataset, while the market fully priced stagflation around the first oil shock in 1973, it reacted much less violently through the second one (1977-79), pricing in only a 40% probability of stagflation then. Through the early 1990s savings & loans crisis / first Gulf war the market priced nearly 50% probability of stagflation.

S&P500 internals implied probability of stagflation:
Today: 5%
GFC 40% (was soon seen as disinflationary)
S&L crisis / First Gulf war : 50%
First oil shock 1973: nearly 100%

Today, the market implied probability of 5% is smaller than that implied by the macro data based Stagflation Pressure Index at 8%. This suggests the S&P500 is looking through macro data weakness.

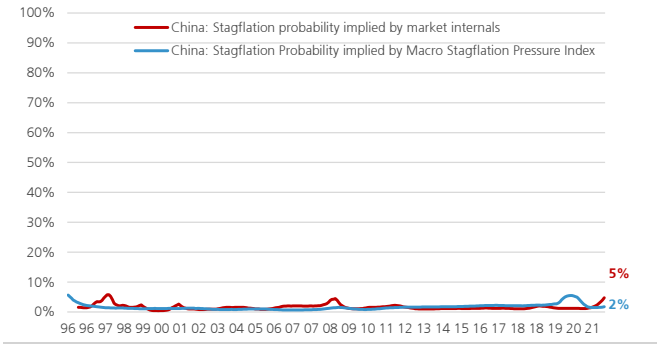
At 25% European equities area is implying a much higher probability of stagflation than US equities. The market implied probability of stagflation in Europe is a little higher than that implied by macro data, i.e., unlike the US, European stocks are priced more bearishly than the data (Figure 32).

Figure 33: UK stagflation: Macro data market implied probability



Source: MSCI, Datastream, Bloomberg, UBS

Figure 34: China stagflation: Macro data and market implied probability



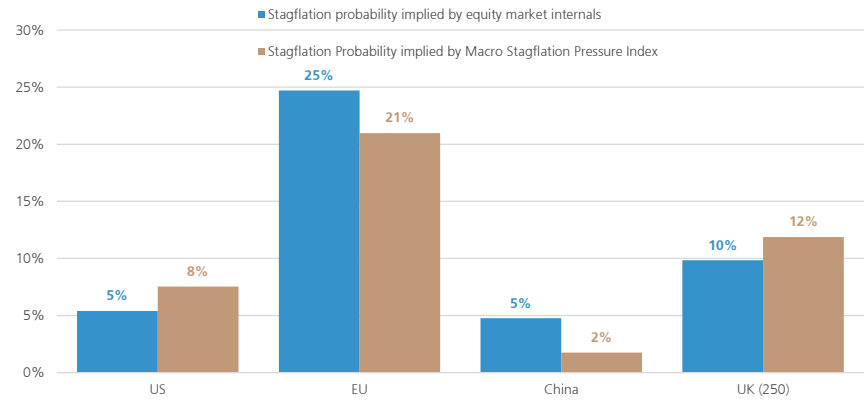
Source: MSCI, Datastream, Bloomberg, UBS

UK stocks are implying a 10% probability of stagflation. Even though we focus on FTSE 250 to exclude the large international companies in FTSE 100 , even these companies have significant global exposure, so we could be underestimating the true probabilities of stagflation implied by UK stocks (Figure 33). China is a largely domestic market though, and here the implied probability of stagflation is 5% (Figure 34), similar to the that of S&P500, which is remarkable given how much higher inflation is in the US relative to China. This suggests that the probability of a recession (as opposed stagflation) implied by Chinese equities must be much higher. This isn't the subject of this note, but we can apply this methodology to also back out probabilities of recessions. We will follow up with that work.

Eurostoxx 600 : 25% probability of Stagflation
FTSE 250: 10% probability of stagflation
MSCI China: 5% probability of stagflation

Figure 35 **shows the the macro data implied and market implied probability of stagflation across different markets**. In Europe and China the market is more worried than the market data whereas the opposite seems true of US and UK (again, UK stocks may not be giving a signal only on the UK economy).

Figure 35: Stagflation probability implied by equity market internals and macro data (Stagflation Pressure Index)



Source: MSCI, Datastream, Bloomberg, UBS

Section IV: Stock lists to protect against Stagflation

UBS methodology and framework

In this section, we detail the quantitative process we use to identify stocks that tend to respond to Stagflation pressures. We employ two separate methodologies using a) the macro Stagflation Pressure Index and b) bottom-up pricing power, and then look for their intersection to define our Stagflation Protection list.

We combined two quant screening methodologies to identify stocks that respond to Stagflation pressures

To ensure that our selection process is doing a "decent" job, we simulate the performance of our Stagflation Protection list through time, and plot the one-year rolling returns versus our macro Stagflation Pressure Index, as well as the two lists - the most/least favoured - separately. We also show the cumulative performance over time to access the 'hedging cost'.

Historical backtesting is used to validate the selection process and access the hedging costs

a) Top-down approach based on Stagflation Pressure Index

Stagflation pressure indices are useful not just to compare and contrast macro pressures across time and across countries, but are also a very useful tool in helping build stock lists to protect against stagflation.

The first methodology identifies stocks that track the country/region stagflation pressure indices most closely

Using the macro Stagflation Pressure Index , we construct most favoured and most vs. least favoured lists of stocks that track our country/region stagflation pressure indices most closely.

To measure the sensitivity of a stock with stagflationary risk we rank:

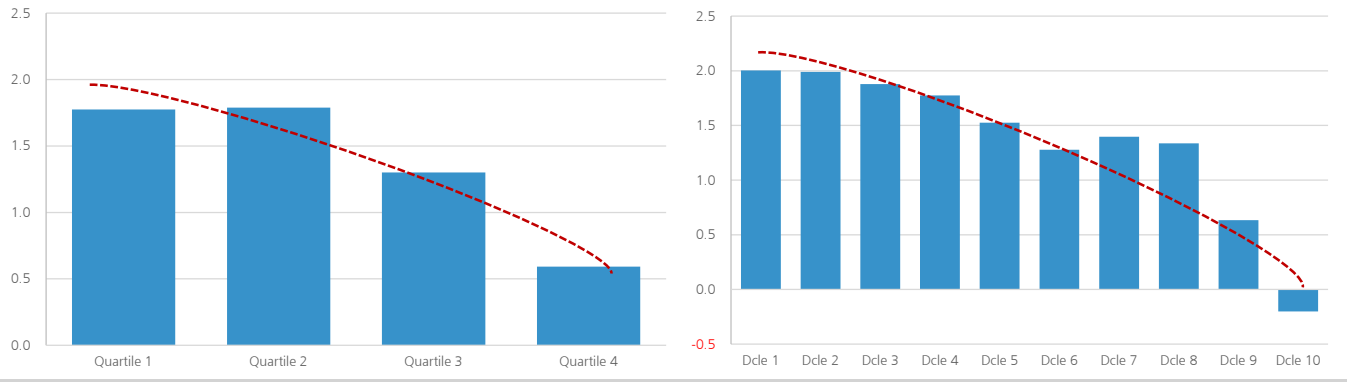
a) the correlation of the stock's total return index to its country's stagflation index,

b) the correlation of the stock's returns to changes in the country stagflation index, and

c) the performance of the stock in the top quartile of the country stagflation index.

We add the third criteria and don't rely just on correlation. That's because correlation is a linear measure and we found that performance of markets changes in a non-linear fashion as stagflation risk rises, falling sharply when stagflation risk is in the top quartile (Figure 36).

Figure 36: Average monthly returns (%) across stocks (full sample: S&P500, SXXP 600, FTSE 350, MSCI APAC), conditional on the level of the Stagflation Pressure Index



Source: MSCI, Datastream, Bloomberg, UBS

b) Bottom-up approach based on Pricing Power

The second methodology focuses on the stocks' relative pricing power/ margin resiliency to stagflationary pressures

We next take a different route to construct stagflation "protection" most favoured and most vs. least favoured lists by focussing on margin stability of stocks in the face of stagflationary pressures.

We look for stocks whose margins show:

a) the most positive relationship with inflation

b) the least sensitivity to weaker growth and

c) the lowest coefficient of variation over time.

A possible shortcoming of an approach focused on a country's growth or inflation to measure stagflation risk or margin pressure is that several 'global' stocks don't have more to do with the macro environment of other countries than that of which they are listed in. That's why in scoring margin strength we also introduce the third criterion of margin stability, which is independent of macro variables.

c) Bringing it together: the best of both approaches

The final selection relies on the intersection of both methodologies, incorporating sectoral constraints to ensure diversification

Having built most favoured and least favoured lists based on these two approaches, we next look for their intersection - stocks selected as the best potential protection" against stagflation by both these approaches. In arriving at our final stock lists we also impose additional constraints:

a) each sector must represent at least 2% of the stock list

b) no sector can represent more than 25% of the stock list (energy will dominate otherwise)

c) if a sector has 'n' stocks within the local equity index, we cannot select more than 'n/2' stocks belonging to this sector

UBS initial results for major Markets

We present sector and stock list results for the S&P500, Eurostoxx 600, FTSE 350 and MSCI APAC

We present sector and stock list results for the S&P500, Eurostoxx 600, FTSE 350 and MSCI APAC (we are not presenting all of them here, but we have results for 45 indices across different regions).

The sector's ranking are consistent with the historical performance analysis we did earlier this year. Across all regions Consumer Staples, Energy and Healthcare are regarded as overweights in both the most favoured and the most vs. least favoured lists. By contrast, Consumer Discretionary stocks and Financials companies are viewed as prime candidates for underweights.

The preference for other sectors moves around a lot in other regions. The model sees industrials as an underweight in the US but as an overweight in Europe. Energy meanwhile is strong overweight in the US while less so in other markets. Both these are likely driven by the improvement in quality of Industrials in Europe and Energy companies in the US over the last decade or so, after excessive investment and subsequent derating led them to limit capex and improve shareholder returns across the whole cycle.

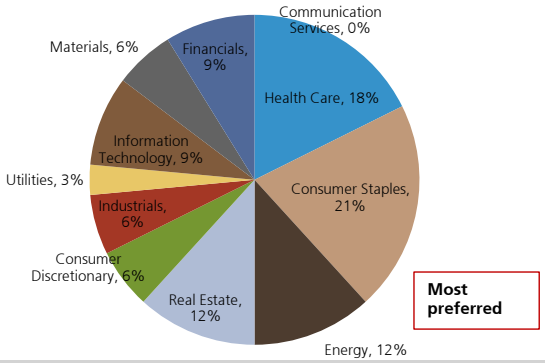
a) Stagflation protection: Sector and stock selection for the S&P500

Using the S&P 500 stock universe, our framework estimates that the most favoured industries to hedge stagflation risks in the US are Food Staples & Retailing, Pharma & Health Care Providers, and Energy (Figure 37) (Figure 39). Energy stocks have scored particularly well on the Stagflation Pressure Index, while Health Care stocks have exhibited strong margin stability.

On the other side of the spectrum, the least favoured industries are Hotels, Restaurants & Leisure, Airlines, and Banks (Figure 38) and (Figure 39). Financial companies have experienced significant volatility in their margins, which explains their low rankings in our framework.

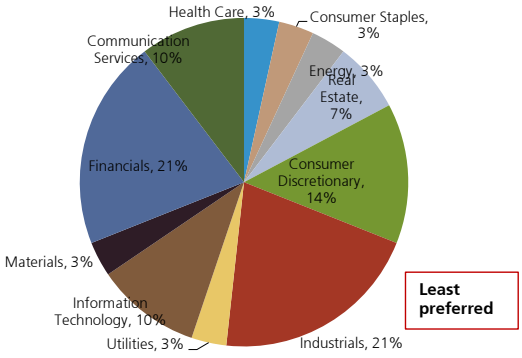
To access the lists of stocks, please use this link.

Figure 37: What to buy: S&P500 sector allocation implied by the list of the most favoured stocks



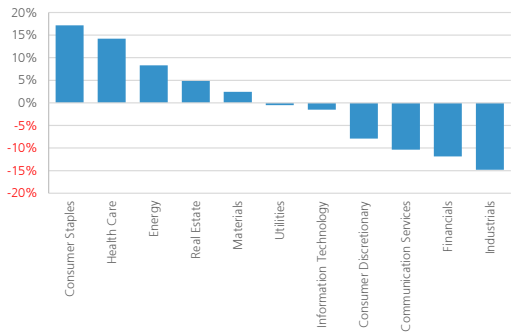
Source: MSCI, Datastream, Bloomberg, UBS

Figure 38: What not to buy: S&P500 sector allocation implied by the list of the least favoured stocks



Source: MSCI, Datastream, Bloomberg, UBS

Figure 39: S&P500: Implied sector allocation when combining most favoured and least favoured stock lists



	Most preferred				Least preferred			
	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ
Health Care	18%	6	0.74	1.37	3%	1	0.27	-0.94
Consumer Staples	21%	7	0.73	1.64	3%	1	0.28	0.20
Energy	12%	4	0.72	1.56	3%	1	0.38	-0.11
Real Estate	12%	4	0.53	1.12	7%	2	0.23	-0.62
Consumer Discretionary	6%	2	0.71	1.05	14%	4	0.27	-0.24
Industrials	6%	2	0.73	1.56	21%	6	0.25	-0.28
Utilities	3%	1	0.70	2.00	3%	1	0.33	-0.63
Information Technology	9%	3	0.73	1.36	10%	3	0.33	-0.22
Materials	6%	2	0.78	2.26	3%	1	0.32	0.10
Financials	9%	3	0.64	1.23	21%	6	0.26	-1.20
Communication Services	0%	0			10%	3	0.30	-0.90
Average	9%	3.1	0.70	1.47	9%	2.6	0.28	-0.55

Source: MSCI, Datastream, Bloomberg, UBS

When plotting the one-year rolling returns of the stagflation protection list (Figure 40) versus our macro Stagflation Pressure index (SPI), as well as the two lists (most favoured and least favoured) separately, it is noticeable that the 'least favoured' list (Figure 43) is doing a better job at tracking the SPI than the 'most favoured' list (Figure 42). This should not come as a surprise given the negative correlation between stock returns and the stagflation pressures indices (Figure 32).

The least favoured stocks in the Stagflation Protection list help tracking the stagflation pressure index...

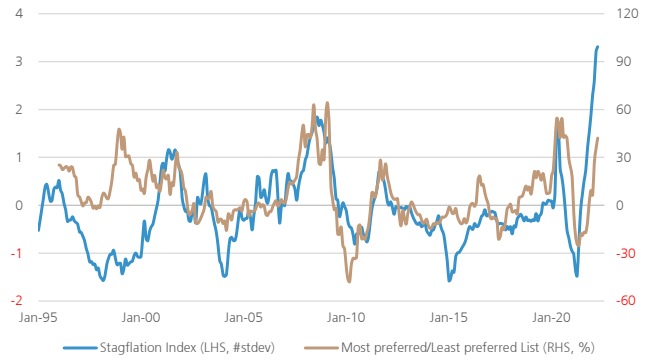
The weak correlation between the 'most favoured' 1yr rolling return and the SPI can be justified by the market inertia. While the most favoured stocks tend to outperform the least favoured stocks when stagflation fears arise, their market beta will drag their absolute performance down. However, the value of the 'most favoured' list is elsewhere: it boosts the most vs. least favoured list Figure 40 performance over time while having a small impact on the tracking of the SPI. In other words, it does not alter the hedging

properties but significantly reduces the hedging costs.

...while the most favoured stocks help lift the overall performance

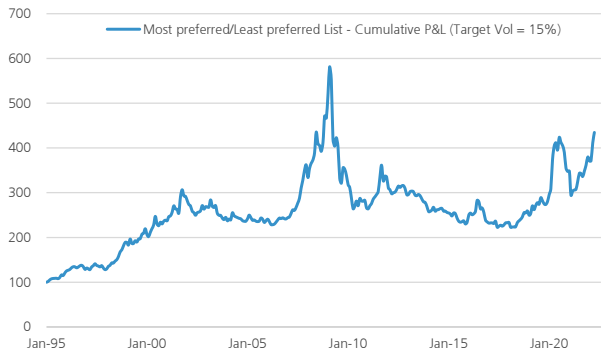
Since January 1995, the most vs. least favoured list (Figure 40), scaled at 15% target volatility, has returned 6.5% in average per year (Figure 41, S&P has returned 11.1% a year over the same period), with a 41% correlation with the US SPI. But most importantly, it also delivered 2.4% per month during months when the SPI was in its top quartile, periods where the overall market was under pressure (Figure 44).

Figure 40: One-year rolling returns of the Most/Least favoured list versus our stagflation index



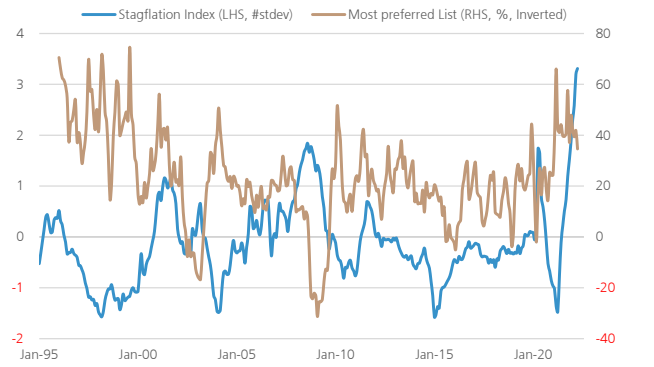
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 41: Cumulative performance of the Most/Least favoured Stagflation Protection list over time



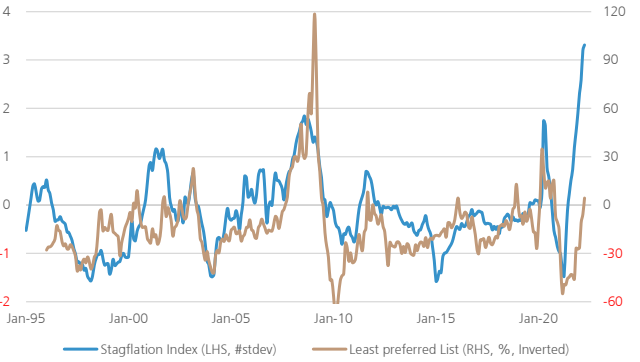
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 42: One-year rolling returns of the S&P 500 most favoured list versus our US stagflation index



Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured stock list scaled at 15% target volatility

Figure 43: A much better fit: One-year rolling returns of the S&P 500 least favoured list versus our US stagflation index

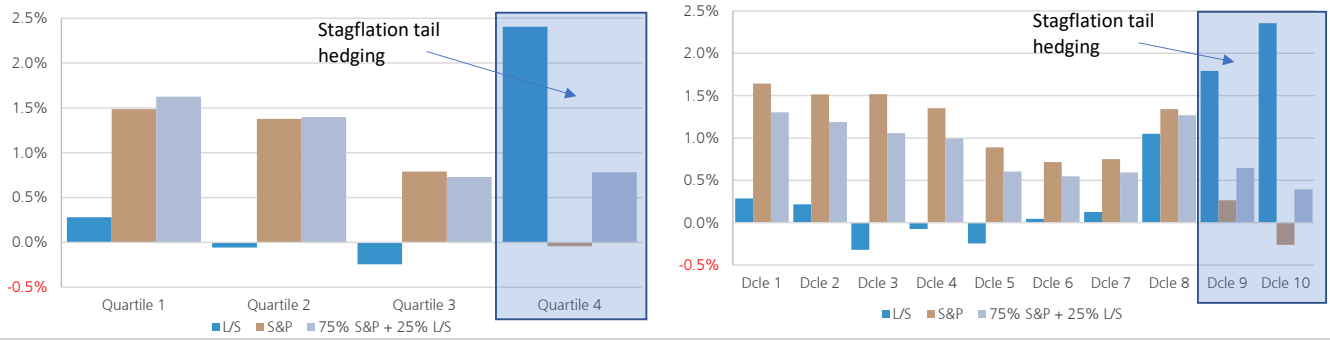


Source: MSCI, Datastream, Bloomberg, UBS,Most/Least favoured stock list scaled at 15% target volatility

Next, we look at the diversification and hedging benefits of the most vs. least favoured list when associated with the S&P. With a correlation of -26% with the S&P, the most vs. least favoured list would have been a very useful source of diversification. A '25% most/least favoured list + 75% S&P' portfolio would have outperformed the S&P by 2.6% a year, with a Sharpe ratio edging higher from 0.73 to 0.91. It would also have improved its stagflation tail risk, returning 0.8% a month (vs -0.1% for S&P alone) when the SPI was in its top quartile (Figure 44).

The US Stagflation Protection list has exhibited a correlation of -26% with the S&P, offering strong diversification benefits

Figure 44: S&P500 average monthly returns, conditional on the level of the stagflation index



Source: MSCI, Datastream, Bloomberg, UBS

b) Stagflation protection: Sector and stock selection for Eurostoxx 600

Using Eurostoxx 600 stock universe, excluding UK companies, we found that the most favoured industries to hedge stagflation risks in Europe are Pharma & Health Care Equipment, Luxury Goods, and Aerospace & Defense (Figure 45 and Figure 47). By contrast, the least favoured industries are Autos, Banks & Diversified Financial Services, and Materials (Figure 46 and Figure 47).

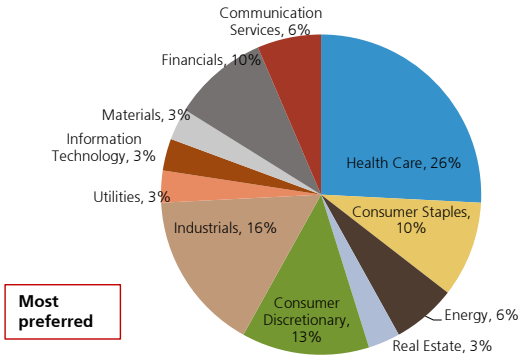
Aerospace & Defense stocks have scored particularly well on the Stagflation Pressure index, with the recent Russia-Ukraine tensions likely heightening the relationship.

For banks, the GFC and the EU sovereign crisis being identified as periods of high stagflation pressures explains their low rankings in our framework.

Within consumer discretionary, it is worth noting the big divergence between Luxury Goods, seen as potential winners, and Autos, seen as potential losers if stagflationary risk were to persist.

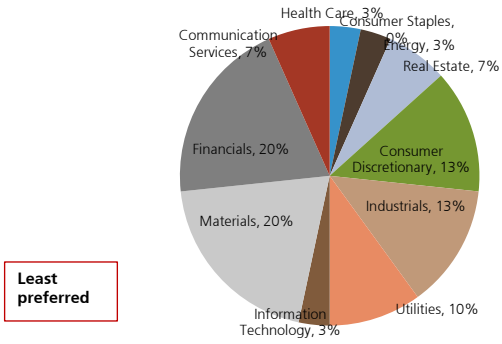
To access the lists of stocks, please use this link.

Figure 45: What to buy: SXXP 600 sector allocation implied by the list of the most favoured stocks



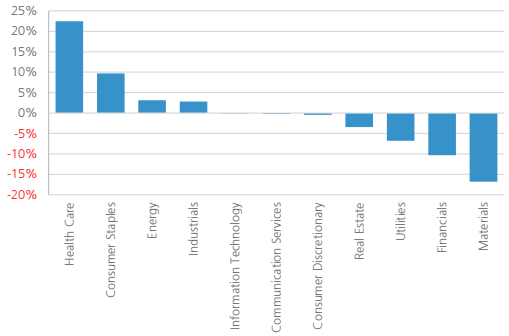
Source: MSCI, Datastream, Bloomberg, UBS

Figure 46: What not to buy: SXXP 600 sector allocation implied by the list of the least favoured stocks



Source: MSCI, Datastream, Bloomberg, UBS

Figure 47: SXXP 600: Implied sector allocation when combining most favoured and least favoured stock lists



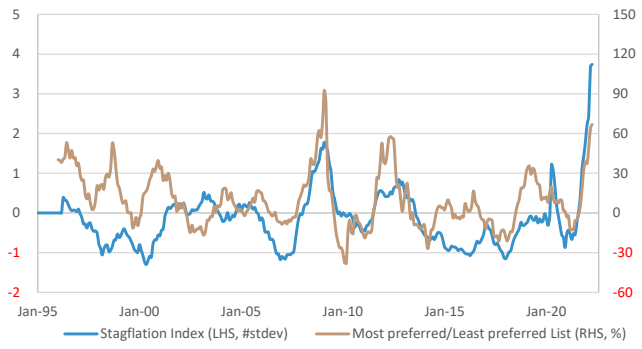
	Most preferred				Least preferred			
	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ
Health Care	26%	8	0.70	5.93	3%	1	0.28	1.21
Consumer Staples	10%	3	0.67	5.64	0%	0		
Energy	6%	2	0.68	4.46	3%	1	0.40	3.65
Real Estate	3%	1	0.57	6.27	7%	2	0.27	2.84
Consumer Discretionary	13%	4	0.68	5.75	13%	4	0.27	1.38
Industrials	16%	5	0.71	7.27	13%	4	0.33	2.64
Utilities	3%	1	0.58	2.20	10%	3	0.32	0.14
Information Technology	3%	1	0.63	3.63	3%	1	0.37	4.39
Materials	3%	1	0.62	7.78	20%	6	0.31	1.62
Financials	10%	3	0.67	6.49	20%	6	0.30	1.12
Communication Services	6%	2	0.68	6.01	7%	2	0.38	0.92
Average	9%	2.8	0.68	5.94	9%	2.7	0.31	1.66

Source: MSCI, Datastream, Bloomberg, UBS

In line with the US, we can observe that: 1) the 'Least favoured' list (Figure 51) does a decent job at tracking the Eurozone stagflation pressure index (SPI) but comes with a cost (-15% average annualized returns), 2) the 'Most favoured' list (Figure 50) does a poor job at tracking the Eurozone SPI but does well over time (+25% average annualized returns), 3) the 'Most vs. Least favoured' list (Figure 49) keeps the best properties of both lists, by tracking reasonably well the SPI and delivering good returns (+10% average annualized returns, with a target volatility at 15%)

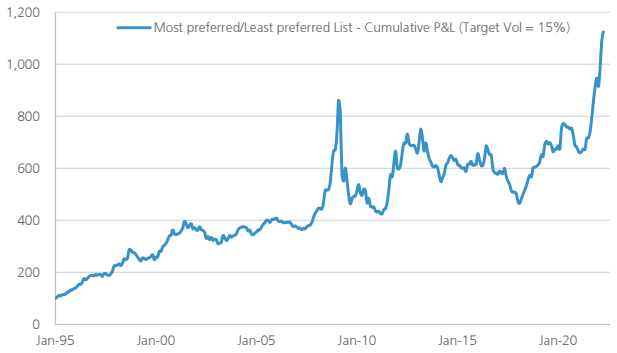
The Eurozone Stagflation Protection list had a good standalone performance (Sharpe ratio of 0.6) and tracked the EU stagflation pressure index reasonably well (correlation of 50%)

Figure 48: One-year rolling returns of the SXXP 600 Most/ Least favoured list versus our Eurozone stagflation index



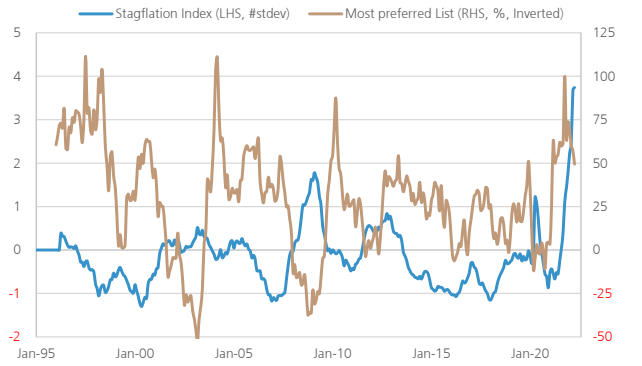
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 49: Cumulative performance of the Most/Least favoured list overtime



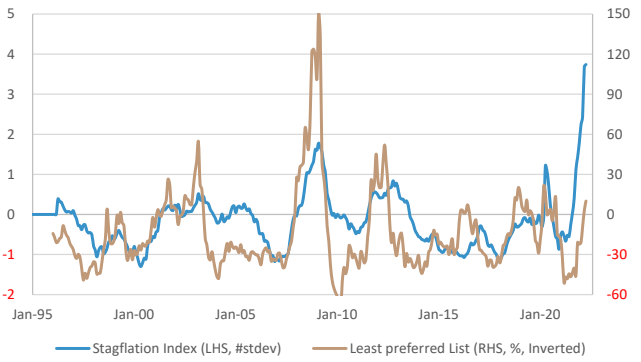
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 50: One-year rolling returns of the SXXP 600 most favoured list versus our Eurozone stagflation index



Source: MSCI, Datastream, Bloomberg, UBS,Most/Least favoured list scaled at 15% target volatility

Figure 51: One-year rolling returns of the SXXP 600 least favoured list versus our Eurozone stagflation index



Source: MSCI, Datastream, Bloomberg, UBS Most/Least favoured list scaled at 15% target volatility

c) Stagflation protection: Sector and stock list results for the FTSE 350

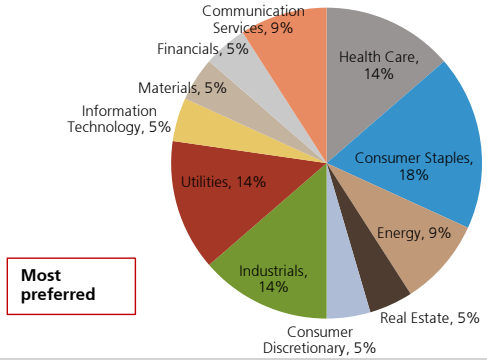
Using the FTSE 350 stock universe, we found that the most favoured industries to hedge stagflation risks in the UK are Pharma & Health Care Equipment, Tobacco & Beverages, and Utilities (Figure 52and Figure 54). On the opposite side, the least favoured industries are Hotels, Restaurants & Leisure, Specialty Retail, Materials, and Equity Real Estate Investment (Figure 53 and Figure 54).

UK Real Estate companies have experienced great volatility in their margins, notably during GFC, dragging them down in the overall ranking.

Stagflationary pressures having a negative impact on purchasing power, it is not surprising to see UK consumers reducing their leisure spending but unwilling (or unable) to cut out on the essential products like food, beverages and tobacco.

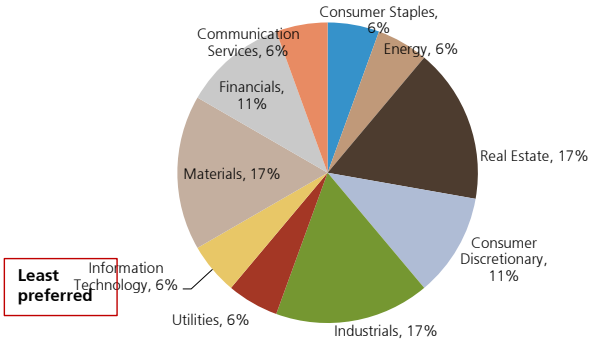
To access the lists of stocks, please use this link.

Figure 52: What to buy: FTSE 350 sector allocation implied by the list of the most favoured stocks



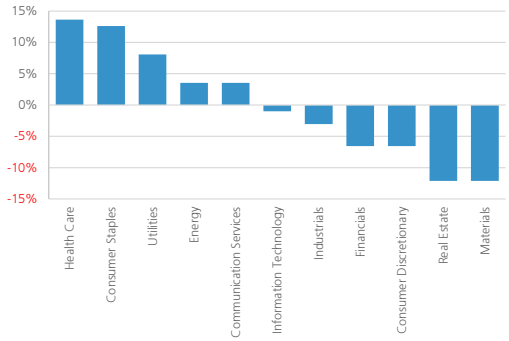
Source: MSCI, Datastream, Bloomberg, UBS

Figure 53: What not to buy: FTSE 350 sector allocation implied by the list of the least favoured stocks



Source: MSCI, Datastream, Bloomberg, UBS

Figure 54: FTSE 350: Implied sector allocation when combining most favoured and least favoured stock lists



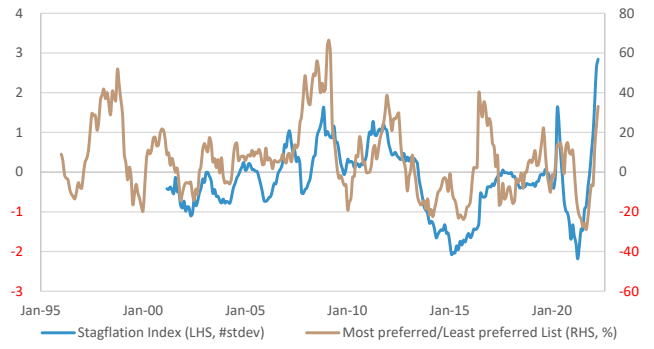
	Most preferred				Least preferred			
	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ
Health Care	14%	3	0.74	5.69	0%	0		
Consumer Staples	18%	4	0.67	6.59	6%	1	0.38	-0.45
Energy	9%	2	0.68	4.61	6%	1	0.52	2.41
Real Estate	5%	1	0.58	4.13	17%	3	0.34	-1.64
Consumer Discretionary	5%	1	0.61	5.15	11%	2	0.37	2.48
Industrials	14%	3	0.66	7.49	17%	3	0.34	2.49
Utilities	14%	3	0.68	5.32	6%	1	0.44	0.90
Information Technology	5%	1	0.67	3.66	6%	1	0.43	4.12
Materials	5%	1	0.56	4.43	17%	3	0.31	1.91
Financials	5%	1	0.66	7.56	11%	2	0.32	-2.29
Communication Services	9%	2	0.66	5.47	6%	1	0.38	3.32
Average	9%	2.0	0.67	5.77	9%	1.6	0.36	1.05

Source: MSCI, Datastream, Bloomberg, UBS

In line with the US and Europe, the 'most/ vs. least favoured' list (Figure 55) tracks reasonably well the UK stagflation pressure index thanks to the least favoured leg (Figure 58) while delivering good returns (+7% average annualized returns, with a target volatility at 15%) thanks to the most favoured leg (Figure 57).

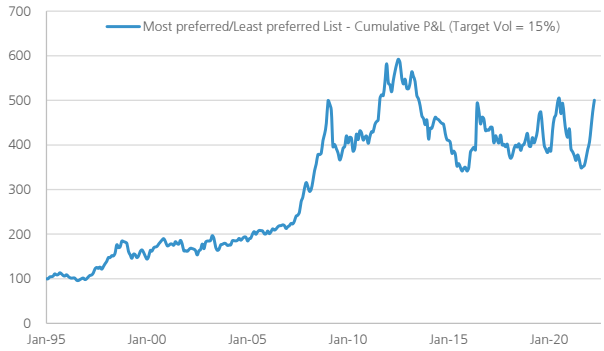
The UK Stagflation Protection list had a good standalone performance (Sharpe ratio of 0.47) and tracked the UK stagflation pressure index reasonably well (correlation of 54%)

Figure 55: One-year rolling returns of the FTSE 350 Most/ Least favoured list versus our UK stagflation index



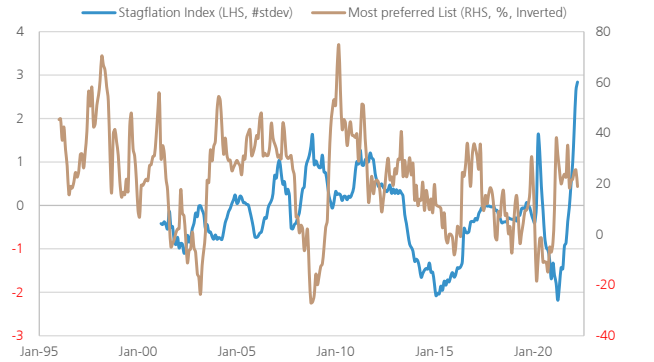
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 56: Cumulative performance of the FTSE 350 Most/ Least favoured list over time



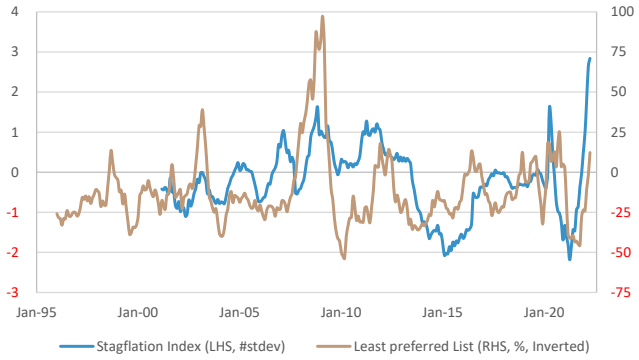
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 57: One-year rolling returns of the FTSE 350 most favoured list versus our UK stagflation index



Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 58: One-year rolling returns of the FTSE 350 least favoured list versus our UK stagflation index



Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

d) Stagflation protection: Sector and stock list results for the MSCI APAC

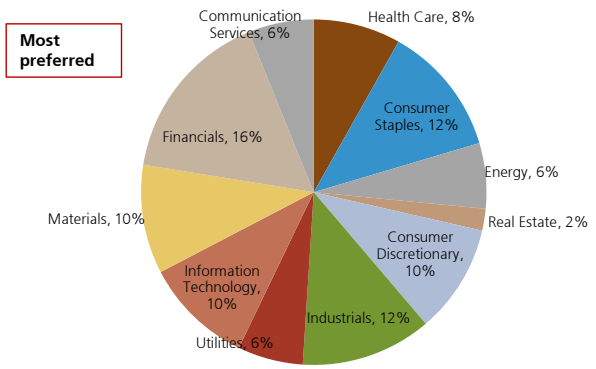
For the Asia-pacific stocks universe, we included China, South Korea, Taiwan, India, Indonesia, Thailand, Australia and Japan stocks. Using this broad universe, we found that the most favoured sectors to hedge stagflation risks in Asia are Health Care, Energy, and Consumer Staples (Figure 59) and (Figure 61). By contrast, the least favoured sectors are Real Estate, Consumer Discretionary and Financials (Figure 60 and Figure 61).

In the last two years, very indebted Asian developers have contributed to their sector underperformance when stagflation risks were rising. Therefore, the Real Estate sector scores the worst in our framework overall.

Regarding the country repartition within the stock selections, it is well distributed although the biggest equity markets (China, South Korea) get slightly higher shares. South Korea Industrials and India Health Care pop up on the most favoured side, while China and Australia Real Estate emerge on the least favoured side (Figure 62).

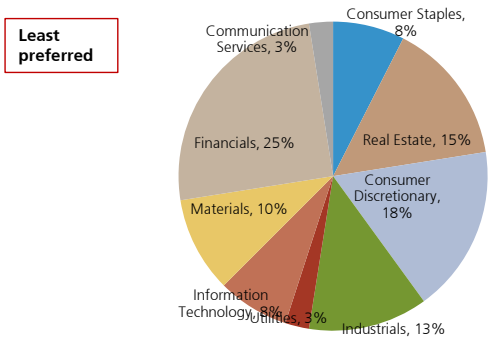
To access the lists of stocks, please use this link.

Figure 59: What to buy: MSCI APAC sector allocation implied by the list of the most favoured stocks



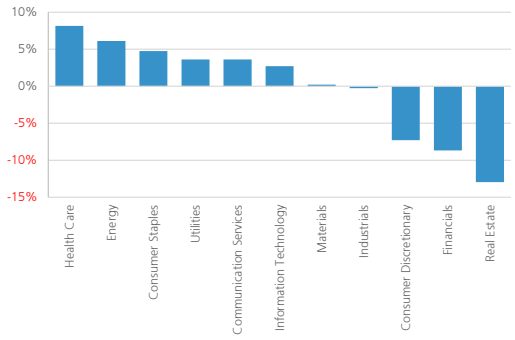
Source: MSCI, Datastream, Bloomberg, UBS

Figure 60: What not to buy: MSCI APAC sector allocation implied by the list of the least favoured stocks



Source: MSCI, Datastream, Bloomberg, UBS

Figure 61: MSCI APAC: Implied sector allocation when combining most favoured and least favoured stock lists



	Most preferred				Least preferred			
	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ	Weight	# Stocks	Avg Score	Avg Monthly Ret TQ
Health Care	8%	4	0.75	3.90	0%	0		
Consumer Staples	12%	6	0.70	3.08	8%	3	0.27	-2.56
Energy	6%	3	0.72	1.44	0%	0		
Real Estate	2%	1	0.75	2.13	15%	6	0.28	-8.10
Consumer Discretionary	10%	5	0.71	4.57	18%	7	0.30	-4.34
Industrials	12%	6	0.70	2.10	13%	5	0.27	-6.51
Utilities	6%	3	0.73	3.31	3%	1	0.31	-3.66
Information Technology	10%	5	0.72	3.24	8%	3	0.28	-5.46
Materials	10%	5	0.73	1.56	10%	4	0.29	-5.39
Financials	16%	8	0.69	1.65	25%	10	0.28	-5.52
Communication Services	6%	3	0.70	2.26	3%	1	0.29	-4.21
Average	9%	4.5	0.71	2.65	9%	3.6	0.28	-5.51

Source: MSCI, Datastream, Bloomberg, UBS

Figure 62: Sector and country allocation: MSCI APAC (#stocks)

Most favoured	Korea	Taiwan	India	Indonesia	Thailand	Australia	Japan	China	Total
Health Care	1		3						4
Consumer Staples	2		2			1		1	6
Energy					1	1		1	3
Real Estate								1	1
Consumer Discretionary		1	2			1	1	1	6
Industrials	4				1		1		6
Utilities			1			1		1	3
Information Technology		2				1	2		5
Materials	1					1	1	2	5
Financials	3		1	1				3	8
Communication Services			1		1		1		3
Total	11	3	10	1	3	6	6	10	50

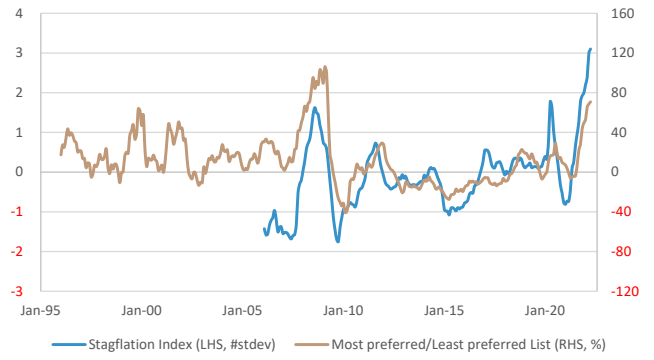
Least favoured	Korea	Taiwan	India	Indonesia	Thailand	Australia	Japan	China	Total
Health Care	1								1
Consumer Staples	1			2					3
Energy			1						1
Real Estate						4		5	9
Consumer Discretionary	1		2			2	2	3	10
Industrials					2	2		2	6
Utilities	1								1
Information Technology		2					1		3
Materials	1						2	1	4
Financials	2	2	2		1	1	2	1	11
Communication Services					1				1
Total	7	4	5	2	4	9	7	12	50

Source: MSCI, Datastream, Bloomberg, UBS

The 'most vs. least favoured' list (Figure 63 and Figure 64) has returned 10.7% a year in average since 1995 (target volatility of 15%) and has had a correlation of 53% with the Asia stagflation pressure index.

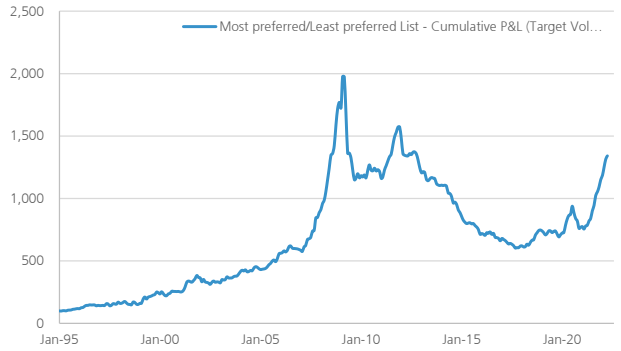
The APAC Stagflation Protection list had a very good standalone performance (Sharpe ratio of 0.7) and tracked the APAC stagflation pressure index reasonably well (correlation of 53%)

Figure 63: One-year rolling returns of the MSCI APAC Most/ Least favoured list versus our APAC stagflation index



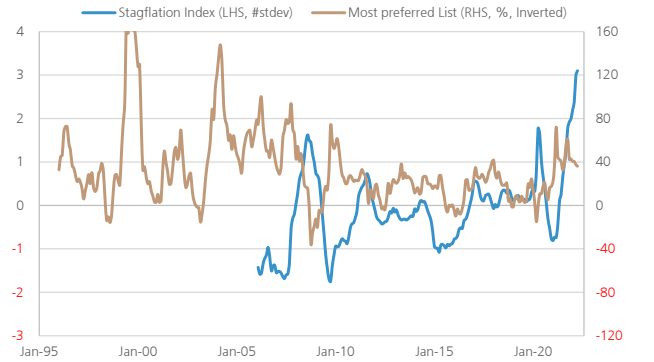
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 64: Cumulative performance of the APAC Most/ Least favoured list overtime



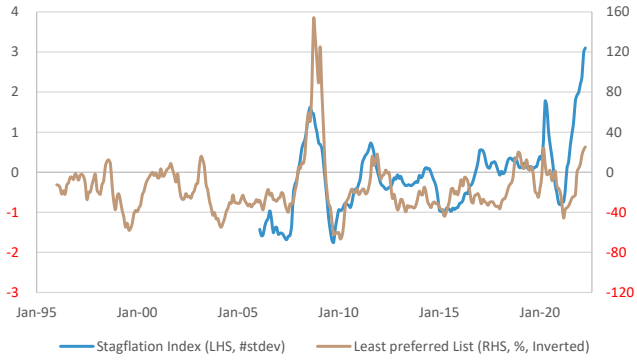
Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 65: One-year rolling returns of the MSCI APAC most favoured list versus our APAC stagflation index



Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

Figure 66: One-year rolling returns of the MSCI APAC least favoured list versus our APAC stagflation index

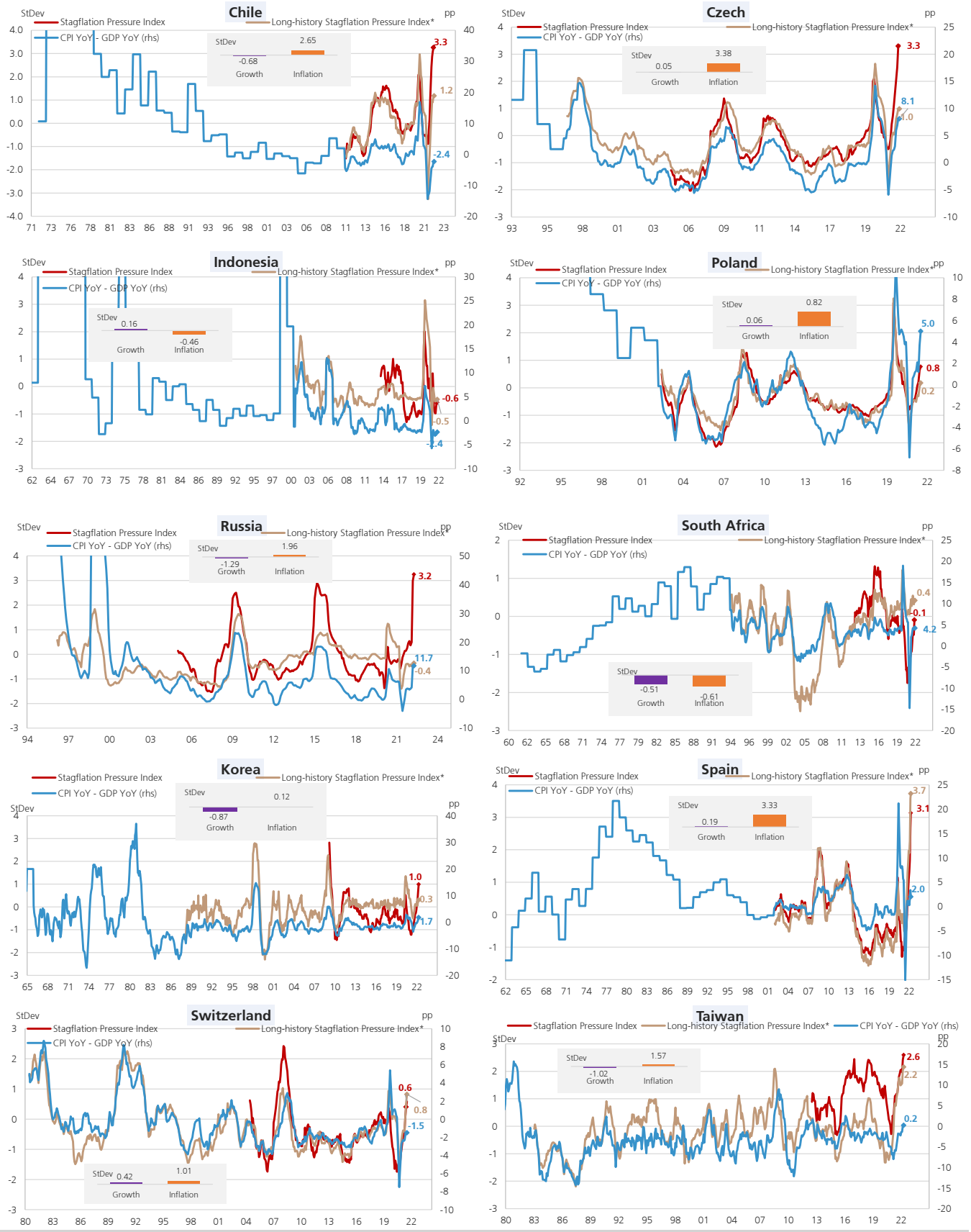


Source: MSCI, Datastream, Bloomberg, UBS, Most/Least favoured list scaled at 15% target volatility

We would like to thank **Sonam Jagga**, **Daksh Gupta**, **Chandan Kishore** and **Mihir Phansalkar**, our research support service professionals, for their assistance in preparing this research report.

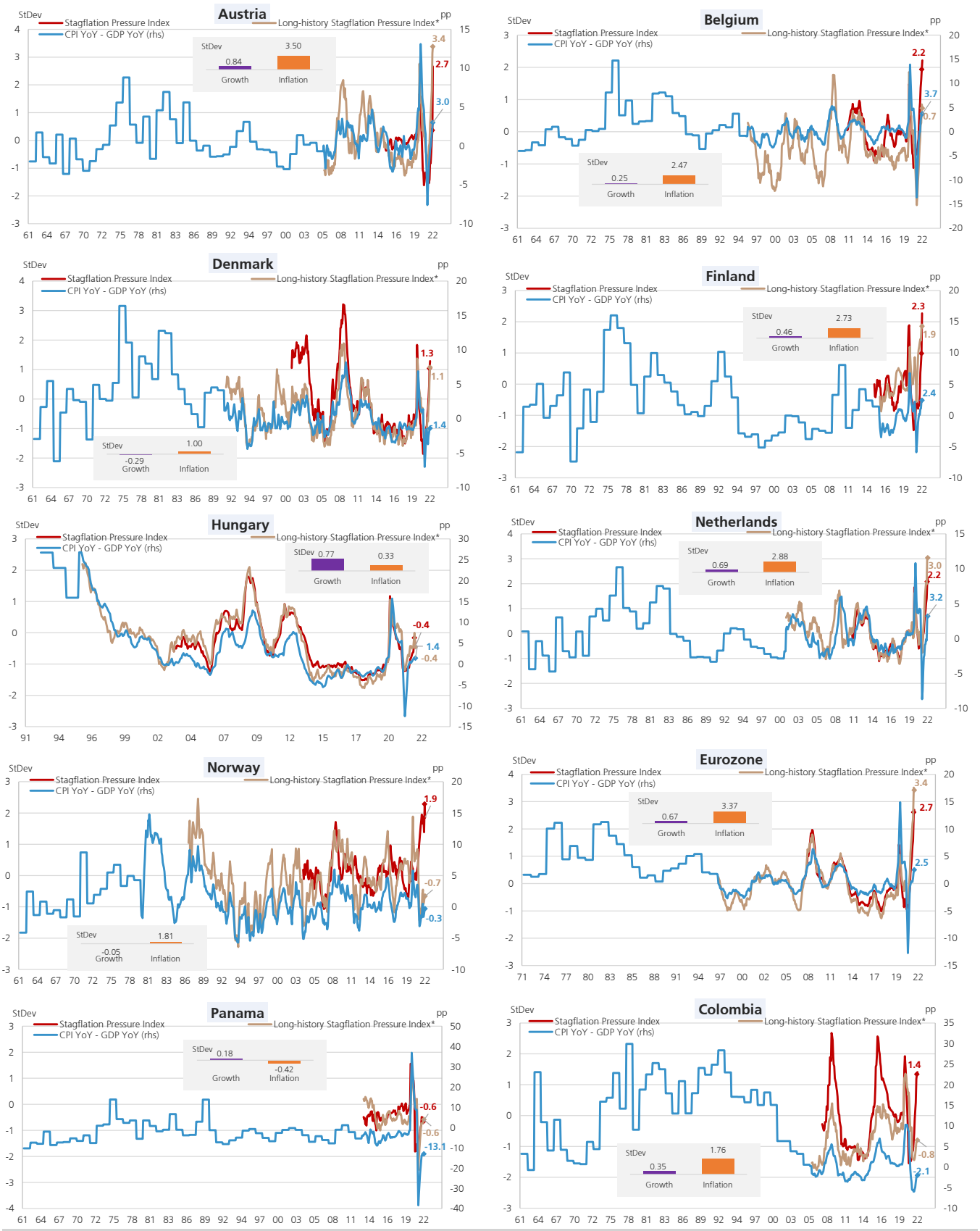
Appendix

Figure 67: Country Stagflation Pressure Indices



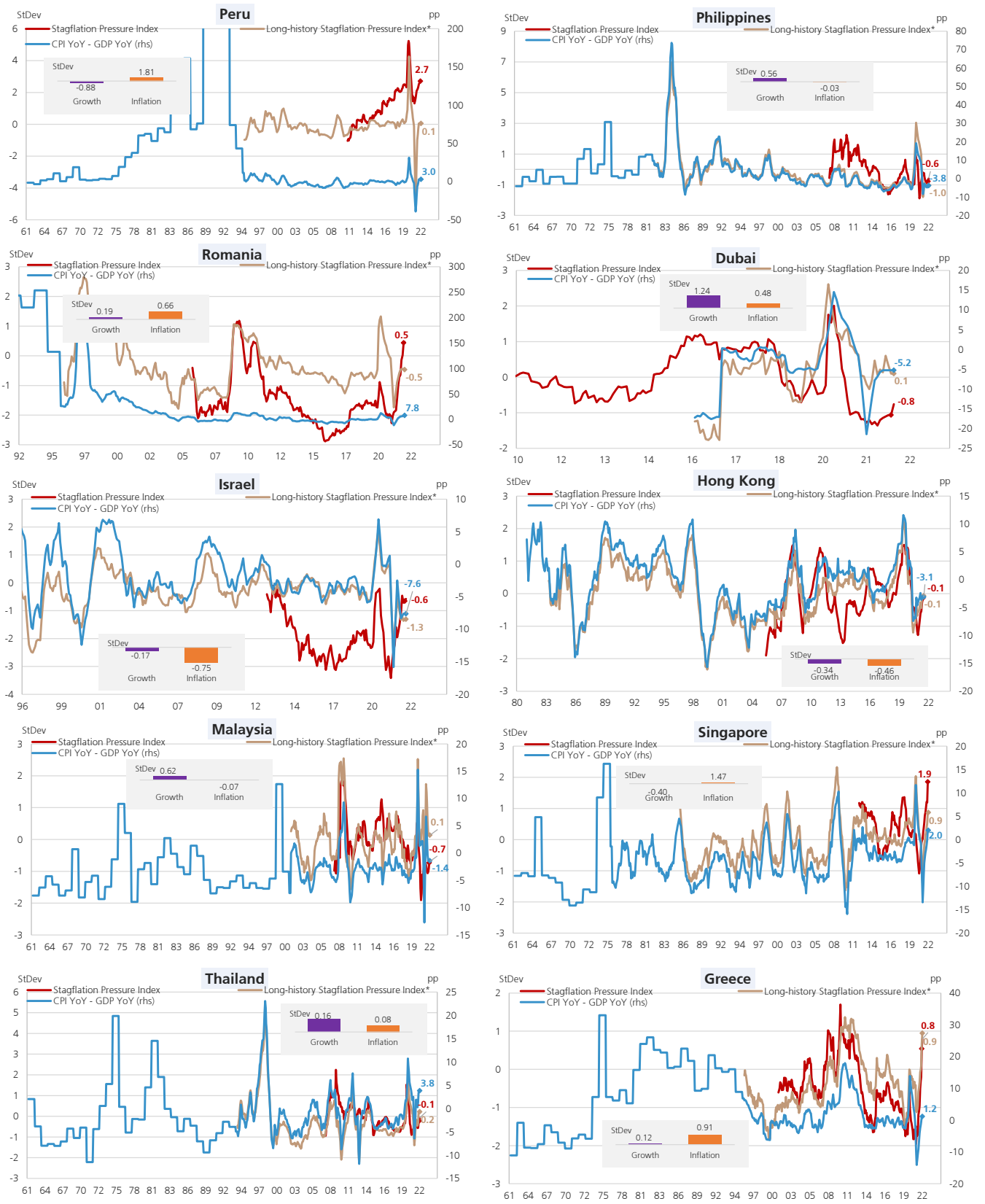
Source: Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices.

Figure 68: Country Stagflation Pressure Indices (cont'd)



Source: MSCI, Datastream, Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices

Figure 69: Country Stagflation Pressure Indices (cont'd)



Source: MSCI, Datastream, Bloomberg, UBS. Note: *based on fewer variables to construct growth, inflation and stagflation indices.

What is half-life and how can we estimate it?

The half-life is a statistical measure borrowed from Physics that helps estimate the persistence/slowness of a stationary (i.e. mean-reverting) process.

In finance, to model a mean reversion process, we usually resort to the Ornstein Uhlenbeck process x_t, which is defined by the following stochastic differential equation:

$$dx_t = a\,(\mu - x_t)dt + \sigma\, dW_t$$

By imposing $\sigma = 0$, i.e. moving from a stochastic to a deterministic process, and $\mu = 0$, i.e. a process centered around 0, we have the 1st order equation below:

$$\frac{dx_t}{dt} = -ax_t$$

Which solution is :

$$x_t = x_0 e^{-at}$$

The half-life being the time required for a quantity to reduce to half of its initial value, we have :

$$x_{t+HL} = \frac{x_t}{2}$$

$$x_0\, e^{-a\,(t+HL)} = \frac{x_0\, e^{-at}}{2}$$

$$e^{-a\,HL} = \frac{1}{2}$$

$$HL = \frac{\ln(2)}{a}$$

Focusing on first time increment from the differential equation, we get :

$$\Delta x_t = -a\, x_t$$

$$x_{t+1} - x_t = -a\, x_t$$

$$x_{t+1} = (1-a)x_t = \beta x_t$$

The half-life is finally given by the formula :

$$HL = \frac{\ln(2)}{1-\beta}$$

Where beta is estimated empirically via autoregression.

Probability of hitting a threshold, over a given horizon - using a VaR like approach

Let's consider a variable X_t that follows an arithmetic Brownian motion with no drift:

$$dX_t = \sigma dW_t$$

If we want to estimate the probability of hitting a given level p at any point of time between 0 and T, i.e. $P\left(\max_{0...T} X_t \geq p\right)$, we have two options : the brute force, i.e. using the Girsanov theorem and the reflection principle, or a conceptual approach that almost involves no stochastic calculus.

The latter relies on a very well-known statistical measure: the value at risk (VaR). The VaR is extensively used in the financial industry to quantify the risk of loss for investments. It is typically defined as the maximum loss which should not be exceeded over a specific time period with a given probability level (or 'confidence level').

One of the three VaR methodologies is the variance-covariance method. It assumes that gains and losses are normally distributed, where potential losses can be framed in terms of standard deviation events from the mean.

The VaR calculation for a single variable is straightforward and can be expressed as :

$$VaR = -\sqrt{n}\,\sigma_d\,\Phi^{-1}(Q)$$

Where n is the time period in days, σ_d is the variable daily volatility ($\sigma_d = \frac{\sigma}{\sqrt{260}}$), Q is the given probability and Φ^{-1} is the inverse of the standard normal cumulative distribution function.

If we express the maximum loss in sigma terms, i.e. $VaR = \alpha\,\sigma$, and invert the above formula, we get :

$$Q(dX_n \geq \alpha\,\sigma) = \Phi\left(-a\sqrt{\frac{260}{n}}\right)$$

Or given X_t is normally distributed and centred around 0, we have the final formula :

$$P\left(\max_{0...T} dX_t \geq \alpha\,\sigma\right) = 2 * Q(dX_T \geq \alpha\,\sigma) = 2\,\Phi\left(-\frac{\alpha}{\sqrt{T}}\right)$$

For normally distributed processes with drift μ, see below the generic formula:

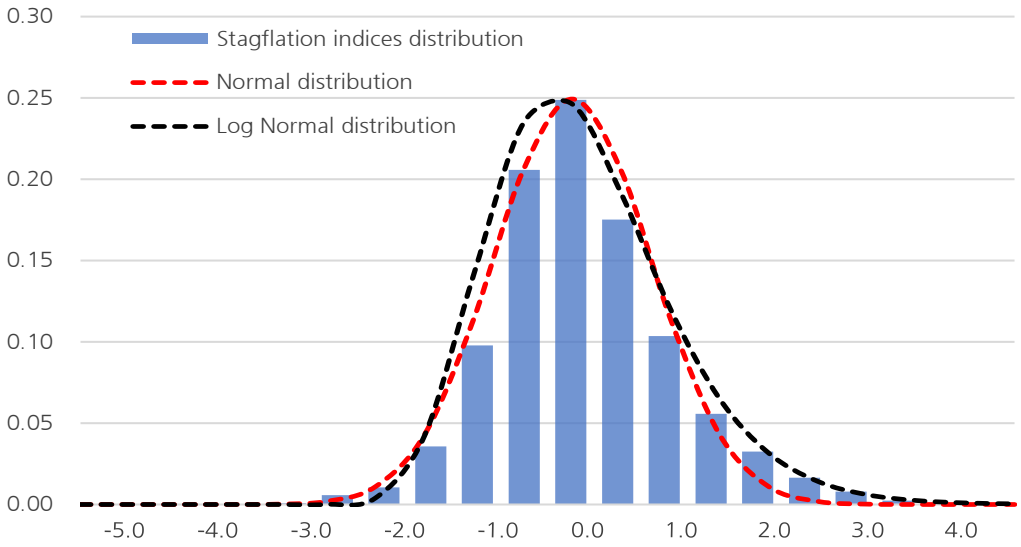
$$P\left(\max_{0...T} X_t \geq p\right) = e^{\frac{2\mu p}{\sigma^2}}\Phi\left(\frac{-\mathrm{p} - \mu\mathrm{T}}{\sigma\sqrt{T}}\right) + \Phi\left(\frac{\mu\mathrm{T} - \mathrm{p}}{\sigma\sqrt{T}}\right)$$

Or in sigma terms :

$$P\left(\max_{0...T} dX_t \geq \alpha\,\sigma\right) = e^{\frac{2\mu a}{\sigma}}\Phi\left(\frac{-\alpha\,\sigma - \mu\mathrm{T}}{\sigma\sqrt{T}}\right) + \Phi\left(\frac{\mu\mathrm{T} - \alpha\,\sigma}{\sigma\sqrt{T}}\right)$$

Probability of hitting a threshold, over a given horizon - using a One Touch option pricing approach

As a follow-up from the previous section, what if the distribution of X_t is log normal instead of normal? How can we estimate the probability $P\left(\max_{0\ldots T} X_t \geq p\right)$?



To answer this question, we have no other choice than to follow the methodology to price digital barrier options, also called One Touch options.

We first define $Y_t = \ln(X_t)$ and then apply the Ito's lemma to get to:

$$dY_t = -\frac{1}{2}\sigma^2 dt + \sigma dW_t$$

With Y_t following an arithmetic Brownian motion with drift $\mu = -\frac{1}{2}\sigma^2$, we can use the last equation from the previous section, replacing p with $\ln(\frac{p}{X_0})$ while σ retains its initial definition. After some algebra, we get :

$$P\left(\max_{0\ldots T} X_t \geq p\right) = \frac{X_0}{p}\Phi\left(\frac{\ln\left(\frac{X_0}{p}\right) + \sigma^2 \mathrm{T}}{\sigma\sqrt{T}}\right) + \Phi\left(\frac{\ln\left(\frac{X_0}{p}\right) - \sigma^2 \mathrm{T}}{\sigma\sqrt{T}}\right)$$

Finally, by defining $p = X_0(1 + \alpha\,\sigma)$, we reach the final formula :

$$P\left(\max_{0\ldots T} \frac{dX_t}{X_t} \geq \alpha\,\sigma\right) = \frac{1}{1 + \alpha\,\sigma}\Phi\left(\frac{-\ln(1 + \alpha\,\sigma) + \sigma^2 \mathrm{T}}{\sigma\sqrt{T}}\right) + \Phi\left(\frac{-\ln(1 + \alpha\,\sigma) - \sigma^2 \mathrm{T}}{\sigma\sqrt{T}}\right)$$

Valuation Method and Risk Statement

Risks of multi-asset investing include but are not limited to market risk, credit risk, interest rate risk, and foreign exchange risk. Correlations of returns among different asset classes may deviate from historical patterns. Geopolitical events and policy shocks pose risks that can reduce asset returns. Valuations may be adversely affected during times of high market volatility, thin liquidity, and economic dislocation.

Required Disclosures

This report has been prepared by UBS AG London Branch, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; certain additional disclosures concerning UBS research recommendations; and terms and conditions for certain third party data used in research report, please visit https://www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report. This recommendation was finalized on: 17 May 2022 10:38 PM GMT. UBS has designated certain Research department members as Derivatives Research Analysts where those department members publish research principally on the analysis of the price or market for a derivative, and provide information reasonably sufficient upon which to base a decision to enter into a derivatives transaction. Where Derivatives Research Analysts co-author research reports with Equity Research Analysts or Economists, the Derivatives Research Analyst is responsible for the derivatives investment views, forecasts, and/or recommendations. **Quantitative Research Review:** UBS publishes a quantitative assessment of its analysts' responses to certain questions about the likelihood of an occurrence of a number of short term factors in a product known as the 'Quantitative Research Review'. Views contained in this assessment on a particular stock reflect only the views on those short term factors which are a different timeframe to the 12-month timeframe reflected in any equity rating set out in this note. For the latest responses, please click https://neo.ubs.com/quantitative, or speak to your UBS sales representative for access to the report.

Analyst Certification:
Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

Research analysts contributing to this report who are employed by any non-US affiliate of UBS Securities LLC are not registered/ qualified as research analysts with FINRA. Such analysts may not be associated persons of UBS Securities LLC and therefore are not subject to the FINRA restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. The name of each affiliate and analyst employed by that affiliate contributing to this report, if any, follows.

UBS AG Hong Kong Branch: Niall MacLeod.**UBS AG London Branch:** Anna Titareva, Bhanu Baweja, Nicolas Le Roux.**UBS Securities LLC:** Alan Detmeister, Jess Eagel, Keith Parker.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

Global Disclaimer

This document has been prepared by UBS AG London Branch, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

This Document is provided solely to recipients who are expressly authorized by UBS to receive it. If you are not so authorized you must immediately destroy the Document.

Global Research is provided to our clients through UBS Neo, and in certain instances, UBS.com and any other system or distribution method specifically identified in one or more communications distributed through UBS Neo or UBS.com (each a system) as an approved means for distributing Global Research. It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means.

All Global Research is available on UBS Neo. Please contact your UBS sales representative if you wish to discuss your access to UBS Neo. Where Global Research refers to "UBS Evidence Lab Inside" or has made use of data provided by UBS Evidence Lab and you would like to access that data please contact your UBS sales representative. UBS Evidence Lab data is available on UBS Neo. The level and types of services provided by Global Research and UBS Evidence Lab to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a client's risk profile and investment focus and perspective (e.g., market wide, sector specific, long-term, short-term, etc.), the size and scope of the overall client relationship with UBS and legal and regulatory constraints.

When you receive Global Research through a system, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the UBS Neo Platform Use Agreement (the "Neo Terms") together with any other relevant terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, you agree that use shall be subject to this Global Research Disclaimer, the Neo Terms and where applicable the UBS Investment Bank terms of business (https://www.ubs.com/global/en/investment-bank/regulatory.html) and to UBS's Terms of Use/Disclaimer (http://www.ubs.com/global/en/legalinfo2/disclaimer.html). In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (http://www.ubs.com/global/en/legalinfo2/privacy.html) and cookie notice (http://www.ubs.com/global/en/homepage/cookies/cookie-management.html).

If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, provide to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.

In certain circumstances (including for example, if you are an academic or a member of the media) you may receive Global Research otherwise than in the capacity of a client of UBS and you understand and agree that (i) the Global Research is provided to you for information purposes only; (ii) for the purposes of receiving it you are not intended to be and will not be treated as a "client" of UBS for any legal or regulatory purpose; (iii) the Global Research must not be relied on or acted upon for any purpose; and (iv) such content is subject to the relevant disclaimers that follow.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction.

This document is a general communication and is educational in nature; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor's individual circumstances or otherwise constitutes a personal recommendation. By providing this document, none of UBS or its representatives has any responsibility or authority to provide or have provided investment advice in a fiduciary capacity or otherwise. Investments involve risks, and investors should exercise prudence and their own judgment in making their investment decisions. None of UBS or its representatives is suggesting that the recipient or any other person take a specific course of action or any action at all. By receiving this document, the recipient acknowledges and agrees with the intended purpose described above and further disclaims any expectation or belief that the information constitutes investment advice to the recipient or otherwise purports to meet the investment objectives of the recipient. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors.

Options, structured derivative products and futures (including OTC derivatives) are not suitable for all investors. Trading in these instruments is considered risky and may be appropriate only for sophisticated investors. Prior to buying or selling an option, and for the complete risks relating to options, you must receive a copy of "The Characteristics and Risks of Standardized Options." You may read the document at http://www.theocc.com/publications/risks/riskchap1.jsp or ask your salesperson for a copy. Various theoretical explanations of the risks associated with these instruments have been published. Supporting documentation for any claims, comparisons, recommendations, statistics or other technical data will be supplied upon request. Past performance is not necessarily indicative of future results. Transaction costs may be significant in option strategies calling for multiple purchases and sales of options, such as spreads and straddles. Because of the importance of tax considerations to many options transactions, the investor considering options should consult with his/her tax advisor as to how taxes affect the outcome of contemplated options transactions.

Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Prior to making any investment or financial decisions, any recipient of this document or the information should take steps to understand the risk and return of the investment and seek individualized advice from his or her personal financial, legal, tax and other professional advisors that takes into account all the particular facts and circumstances of his or her investment objectives.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in any materials to which this document relates (the "Information"), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups, personnel or other representative of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party. In no circumstances may this document or any of the Information (including any forecast, value, index or other calculated amount ("Values")) be used for any of the following purposes:

(i) valuation or accounting purposes;

(ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or

(iii) to measure the performance of any financial instrument including, without limitation, for the purpose of tracking the return or performance of any Value or of defining the asset allocation of portfolio or of computing performance fees.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information.

UBS has policies and procedures, which include, without limitation, independence policies and permanent information barriers, that are intended, and upon which UBS relies, to manage potential conflicts of interest and control the flow of information within divisions of UBS and among its subsidiaries, branches and affiliates. For further information on the ways in which UBS manages conflicts and maintains independence of its research products, historical performance information and certain additional disclosures concerning UBS research recommendations, please visit https://www.ubs.com/disclosures.

Research will initiate, update and cease coverage solely at the discretion of UBS Research Management, which will also have sole discretion on the timing and frequency of any published research product. The analysis contained in this document is based on numerous assumptions. All material information in relation to published research reports, such as valuation methodology, risk statements, underlying assumptions (including sensitivity analysis of those assumptions), ratings history etc. as required by the Market Abuse Regulation, can be found on UBS Neo. Different assumptions could result in materially different results.

The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however,

compensation may relate to the revenues of UBS and/or its divisions as a whole, of which investment banking, sales and trading are a part, and UBS's subsidiaries, branches and affiliates as a whole.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms under English law or, if not carried out by UBS in the UK the law of the relevant jurisdiction in which UBS determines it carries out the activity) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

Within the past 12 months UBS AG, its affiliates or subsidiaries may have received or provided investment services and activities or ancillary services as per MiFID II which may have given rise to a payment or promise of a payment in relation to these services from or to this company.

United Kingdom: This material is distributed by UBS AG, London Branch to persons who are eligible counterparties or professional clients. UBS AG, London Branch is authorised by the Prudential Regulation Authority and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. **Europe:** Except as otherwise specified herein, these materials are distributed by UBS Europe SE, a subsidiary of UBS AG, to persons who are eligible counterparties or professional clients (as detailed in the Bundesanstalt fur Finanzdienstleistungsaufsicht (BaFin) Rules and according to MIFID) and are only available to such persons. The information does not apply to, and should not be relied upon by, retail clients. UBS Europe SE is authorised by the European Central Bank (ECB) and regulated by the BaFin and the ECB. **Germany:** Where an analyst of UBS Europe SE has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE. In all cases it is distributed by UBS Europe SE and UBS AG, London Branch. **Luxembourg, the Netherlands, Belgium and Ireland:** Where an analyst of UBS Europe SE has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE. In all cases it is distributed by UBS Europe SE and UBS AG, London Branch. **Turkey:** Distributed by UBS AG, London Branch. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS AG, London Branch is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Europe SE (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Europe SE (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). Should not be construed as an individual Investment Recommendation for the purpose of the Russian Law - Federal Law #39-FZ ON THE SECURITIES MARKET Articles 6.1-6.2.**Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, Italy Branch. Where an analyst of UBS Europe SE, Italy Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Italy Branch. **France:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, France Branch. Where an analyst of UBS Europe SE, France Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, France Branch. **Spain:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, Spain Branch. Where an analyst of UBS Europe SE, Spain Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Spain Branch. **Sweden:** Prepared by UBS Europe SE and distributed by UBS Europe SE and UBS Europe SE, Sweden Branch. Where an analyst of UBS Europe SE, Sweden Branch has contributed to this document, the document is also deemed to have been prepared by UBS Europe SE, Sweden Branch.**South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **UAE / Dubai:** The information distributed by UBS AG Dubai Branch is only intended for Professional Clients and/or Market Counterparties, as classified under the DFSA rulebook. No other person should act upon this material/communication. The information is not for further distribution within the United Arab Emirates. UBS AG Dubai Branch is regulated by the DFSA in the DIFC. UBS is not licensed to provide banking services in the UAE by the Central Bank of the UAE, nor is it licensed by the UAE Securities and Commodities Authority. **Israel:** This Material is distributed by UBS AG, London Branch. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS AG, London Branch and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS AG, London Branch and its affiliates may prefer various Financial Assets to which they have or may have an Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this Material must not be furnished to, relied on or acted upon by any other persons. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a **'non-US affiliate'**) to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a report prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this report must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Brazil:** Except as otherwise specified herein, this Material is prepared by UBS Brasil Corretora de Câmbio, Títulos e Valores Mobiliários S.A.[1] (UBS Brasil CCTVM) to persons who are eligible investors residing in Brazil, which are considered to be Professional Investors (Investidores Profissionais), as designated by the applicable regulation, mainly the CVM Resolution No. 30 from the 11th of May 2021 (determines the duty to verify the suitability of products, services and transactions with regards to the client's profile). [1]UBS CCTVM is a subsidiary of UBS BB Servicos de Assessoria Financeira e Participacoes S.A. ("UBS BB"). UBS BB is an association between UBS AG and Banco do Brasil (through its subsidiary BB – Banco de Investimentos S.A.), of which UBS AG is the majority owner and which provides investment banking services and coverage in Brazil, Argentina, Paraguay, Peru and Uruguay. **Hong Kong:** Distributed by UBS Securities Asia Limited. Please contact local licensed persons of UBS Securities Asia Limited in respect of any matters arising from, or in connection with, the analysis or document **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 026/08/2021 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this report has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the report. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (ABN 47 088 129 613 and holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (ABN 62 008 586 481 and holder of Australian Financial Services License No. 231098). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. **New Zealand:** Distributed by UBS New Zealand Ltd. UBS New Zealand Ltd is not a registered bank in New Zealand. You are being provided with this UBS publication or material because you have indicated to UBS that you are a "wholesale client" within the meaning of section 5C of the Financial Advisers Act 2008 of New Zealand (Permitted Client). This publication or material is not intended for clients who are not Permitted Clients (non-permitted Clients). If you are a non-permitted Client you must not rely on this publication or material. If despite this warning you nevertheless rely on this publication or material, you hereby (i) acknowledge that you may not rely on the content of this publication or material and that any recommendations or opinions in such this publication or material are not made or provided to you, and (ii) to the maximum extent permitted by law (a) indemnify UBS and its associates or related entities (and their respective Directors, officers, agents and Advisors) (each a 'Relevant Person') for any loss, damage, liability or claim any of them may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material and (b) waive any rights or remedies you may have against any Relevant Person for (or in respect of) any loss, damage, liability or claim you may incur or suffer as a result of, or in connection with, your unauthorised reliance on this publication or material. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This report may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. This material is intended for professional/institutional clients only and not for distribution to any retail clients. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS

Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Distributed by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Number: INZ000259830; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. UBS AG, its affiliates or subsidiaries may have financial interests (e.g. loan/derivative products, rights to or interests in investments, etc.) in the subject Indian company / companies from time to time. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/ clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html **Taiwan:** Except as otherwise specified herein, this material may not be distributed in Taiwan. Information and material on securities/instruments that are traded in a Taiwan organized exchange is deemed to be issued and distributed by UBS Securities Pte. LTD., Taipei Branch, which is licensed and regulated by Taiwan Financial Supervisory Commission. Save for securities/instruments that are traded in a Taiwan organized exchange, this material should not constitute "recommendation" to clients or recipients in Taiwan for the covered companies or any companies mentioned in this document. No portion of the document may be reproduced or quoted by the press or any other person without authorisation from UBS. **Indonesia:** This report is being distributed by PT UBS Sekuritas Indonesia and is delivered by its licensed employee(s), including marketing/sales person, to its client. PT UBS Sekuritas Indonesia, having its registered office at Sequis Tower Level 22 unit 22-1,Jl.Jend. Sudirman, kav.71, SCBD lot 11B, Jakarta 12190. Indonesia, is a subsidiary company of UBS AG and licensed under Capital Market Law no. 8 year 1995, a holder of broker-dealer and underwriter licenses issued by the Capital Market and Financial Institution Supervisory Agency (now Otoritas Jasa Keuangan/OJK). PT UBS Sekuritas Indonesia is also a member of Indonesia Stock Exchange and supervised by Otoritas Jasa Keuangan (OJK). Neither this report nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens except in compliance with applicable Indonesian capital market laws and regulations. This report is not an offer of securities in Indonesia and may not be distributed within the territory of the Republic of Indonesia or to Indonesian citizens in circumstance which constitutes an offering within the meaning of Indonesian capital market laws and regulations.

The disclosures contained in research documents produced by UBS AG, London Branch or UBS Europe SE shall be governed by and construed in accordance with English law.