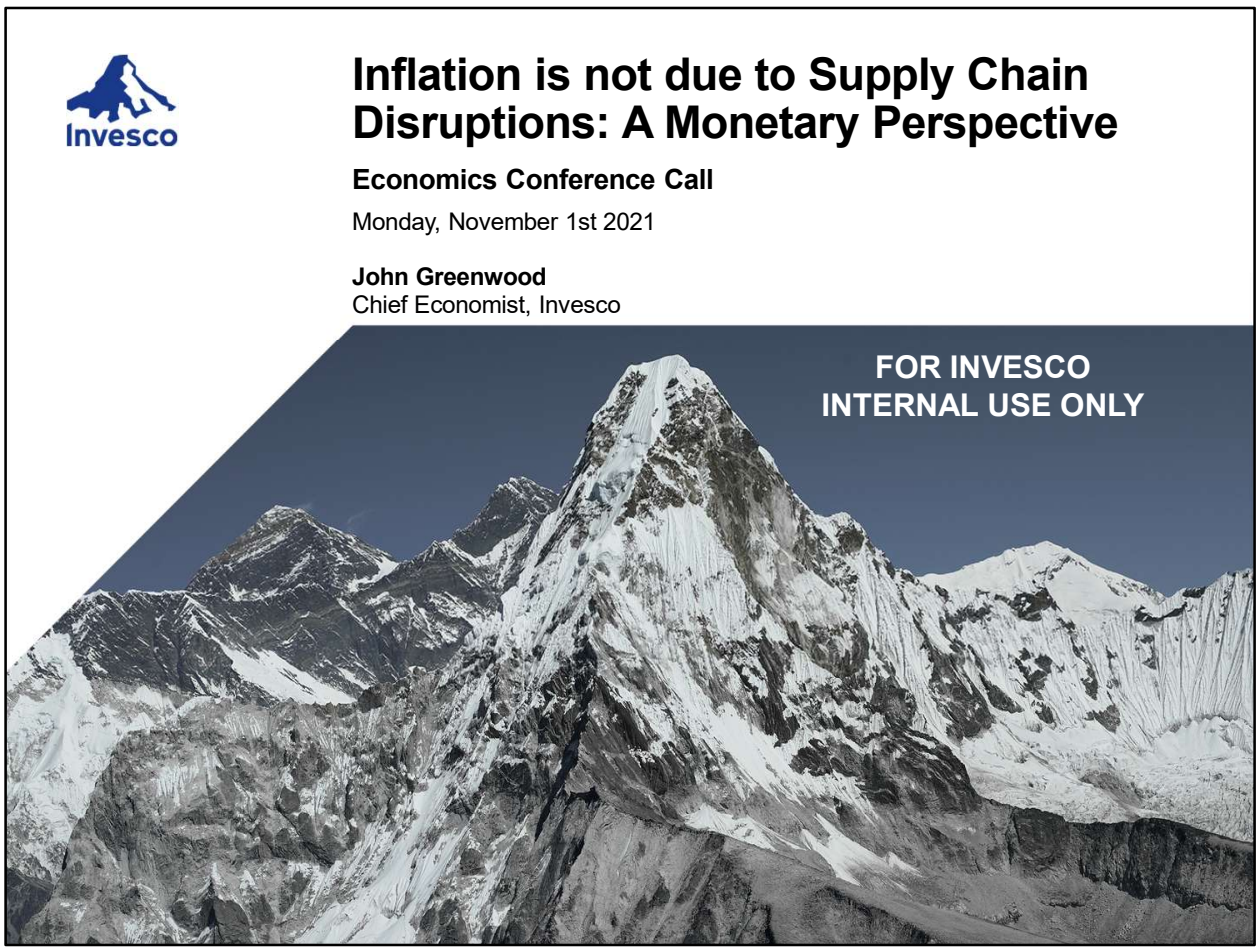


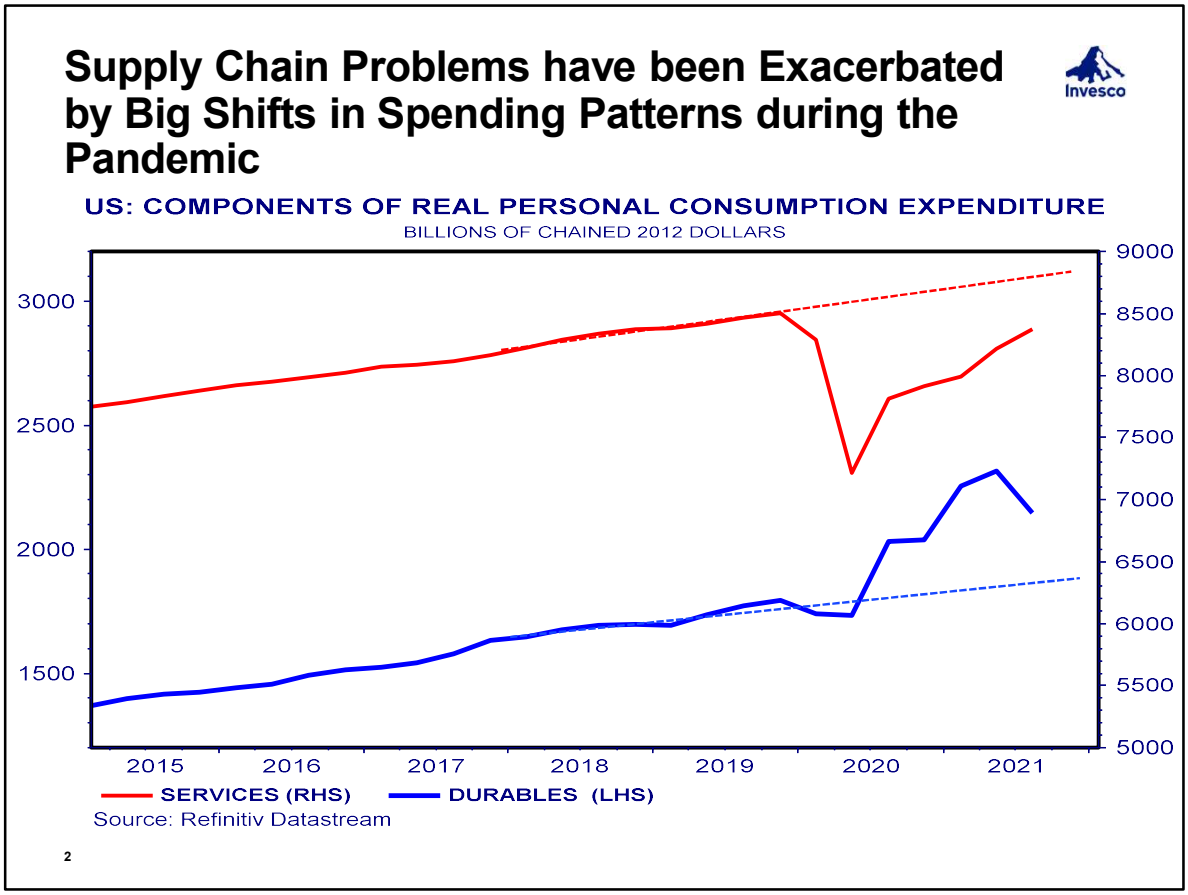
There is a widespread view among officials at the Federal Reserve System, among economists in the Biden Administration, among academics (led by people like Paul Krugman who claims to be a spokesman for "Team Transitory") and even among large parts of the business community that the current bout of US inflation is:

1. A result of supply chain disruptions; and
2. By its nature it will turn out to be "transitory"; and
3. As a result it will melt away in 2022 as the supply chain issues are addressed and resolved.

In my view these notions are fundamentally in error, representing mis-statements of the problem and its true causes. This article is designed to show that the US is facing two problems: (1) in common with many other economies, a big shift in relative prices that is definitely leading to re-pricing and supply chain problems, but (2) unlike other economies, the US has engineered a huge excess of broad money growth over the past 18 months which is exacerbating the supply chain issues but more fundamentally is causing inflation on a scale that few other economies will be facing.

In contrast to the consensus view, I maintain that:

1. US inflation is not the result of supply chain issues
2. The inflation will turn put to be "persistent" (through 2023 and 2024)
3. As a result it will only be reduced when the underlying cause – excess M2 growth – is addressed and resolved.



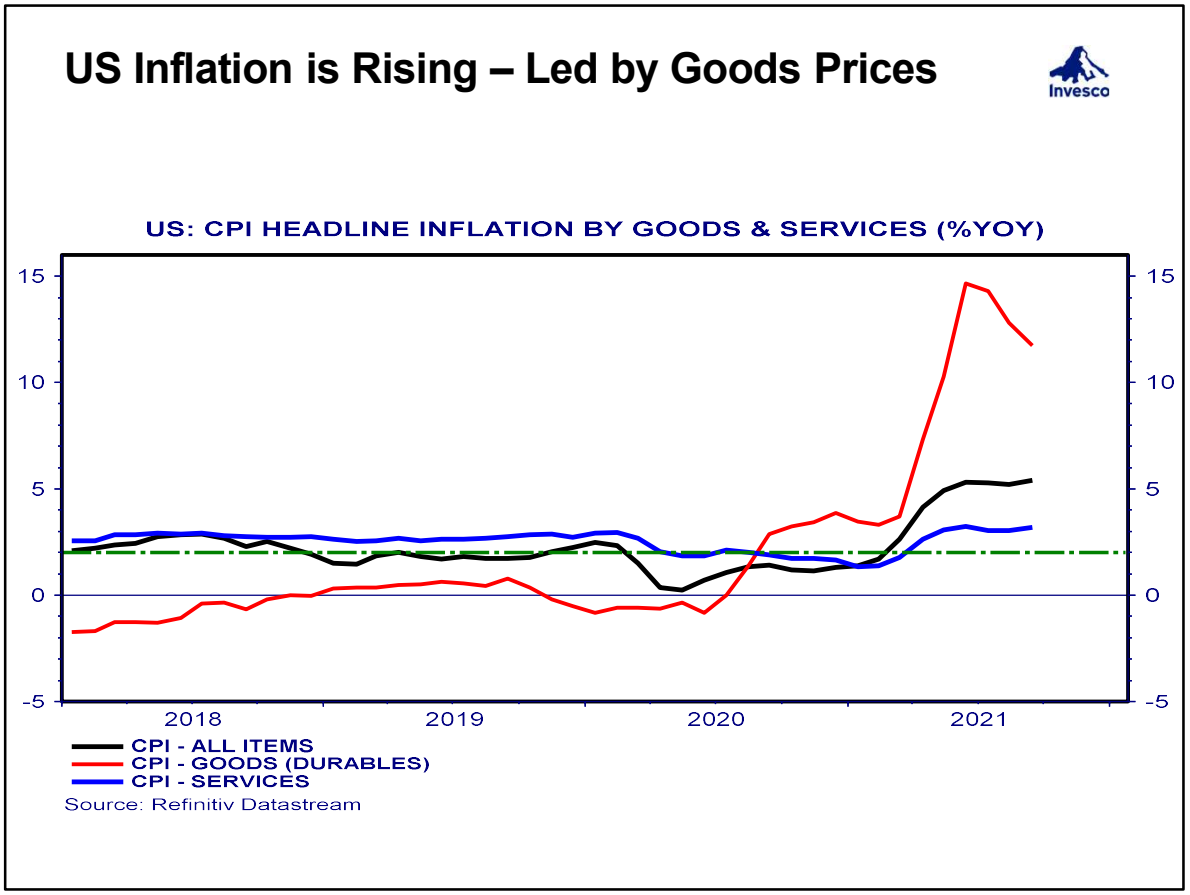
The disruption to supply chains in the US and elsewhere is both very real and very pervasive.

The chart above illustrates the huge shift in consumer spending prompted by the Covid-19 pandemic, a distortion that has played havoc with deliveries of required products by sea, by air and by land.

Service industries (in red), especially those dependent upon in-person services such as hospitality, travel and entertainment all saw abrupt declines in sales and output during the early months of 2020, a decline that has continued to 2021 Q3. At Q3, service output was still 1.6% below its 2019 Q4 level in real terms.

By contrast, with many people staying home and sheltering from the pandemic, orders for goods or durables that could be delivered to their door have increased massively. In 2021 Q3, spending on such durables had increased by 19.6% in real terms compared with its 2019 Q4 level.

All this has required supply chains, output and employment levels in different sectors to be extensively re-configured. Not surprisingly, these shifts in production and required deliveries have led to parallel shifts in prices -- with service prices generally remaining weak or falling due to lack of demand and goods prices generally rising. G3ZSp

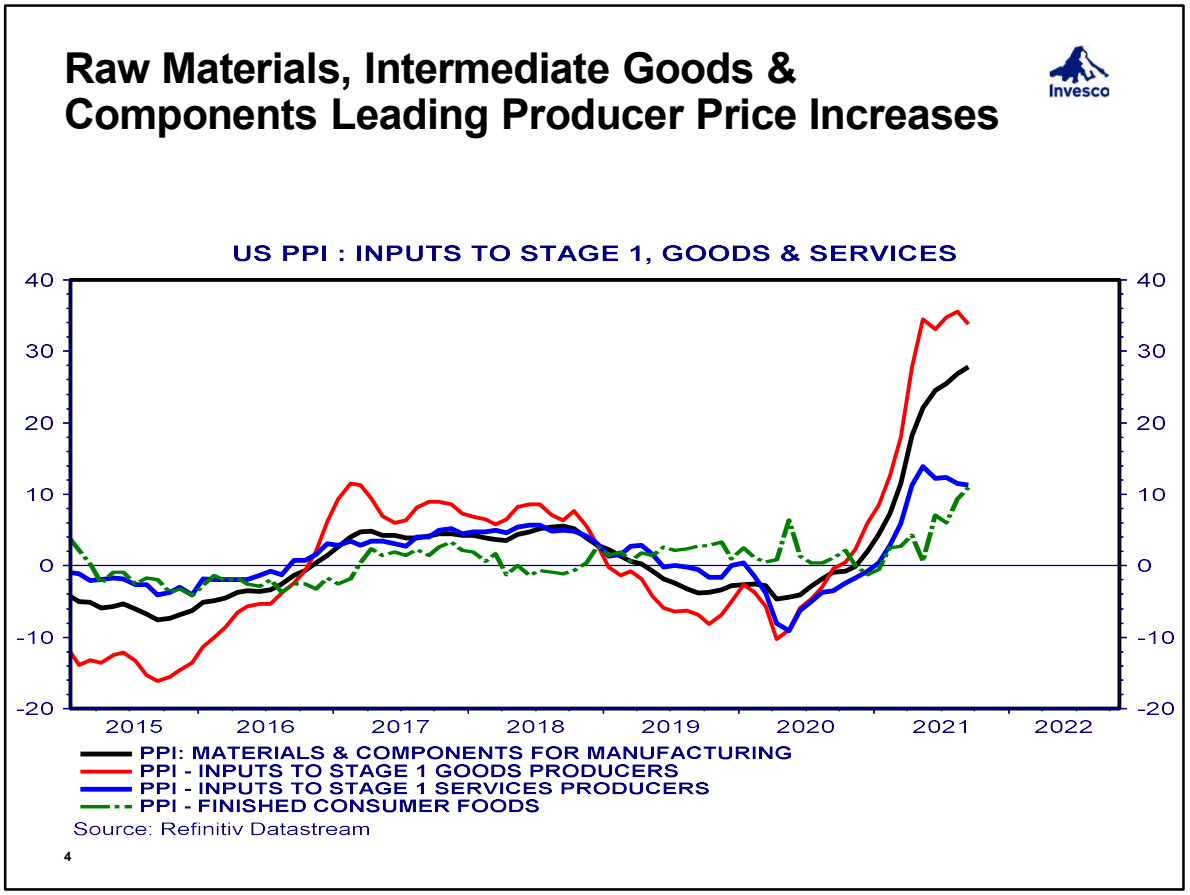


To gain an overview of the problem we start with an examination of the components of the consumer price indices of a number of key economies.

Over the past two decades since 2000 the general pattern in the US has been for goods prices (in red) to be rising very slowly or falling. On average over the period 2000-2019 durable goods prices ***fell*** by an average of -0.9% p.a. Conversely, service prices (in blue) have tended to rise at a faster rates, averaging +2.8% p.a. over the same period. Since the CPI is a weighted average of durables, non-durables (not shown) and services, the overall CPI is the result of the interaction of price movements in each of these three main components. However, the movement of any single set of relative prices (goods or services) gives us no information about the overall inflation rate.

During the pandemic, these relative price changes of the past two decades have been reversed with the prices for durable goods rising much more steeply (so far) than the price of services.

GIOUe

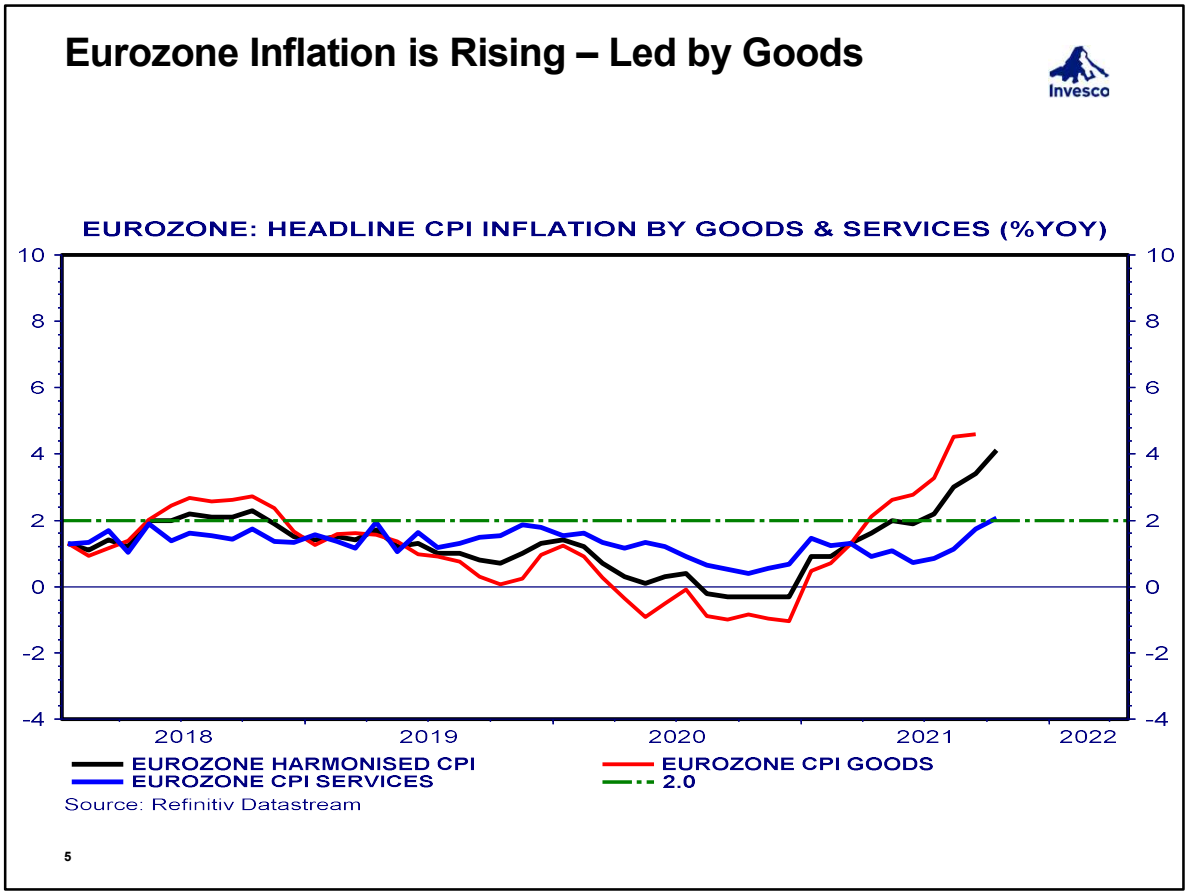


The same trends are evident -- in even more exaggerated form – when we examine the components of the US Producer Price Index. As shown in the chart above, prices of inputs to Stage 1 (goods producers, in red) had risen by 33.8% year-on-year in September 2021. Input of components and materials for the manufacturing sector (in black) had risen by slightly less: +27.8%, and the prices of inputs to the service sector (in blue) had increased by 11.3% over the same period. The overall producer price index for finished goods (in green) had risen by 10.9%.

The general rule, then, is that the narrower the price index and the closer the items are to the first or early stages of the production process, the greater will tend to be the variability of prices. Conversely, the broader the price index and the closer the items included are to final consumer demand, the more stable prices are likely to be.

However, this observation is subject to whatever else is driving price increases in the economy, and it is here that we will find the greatest differences.

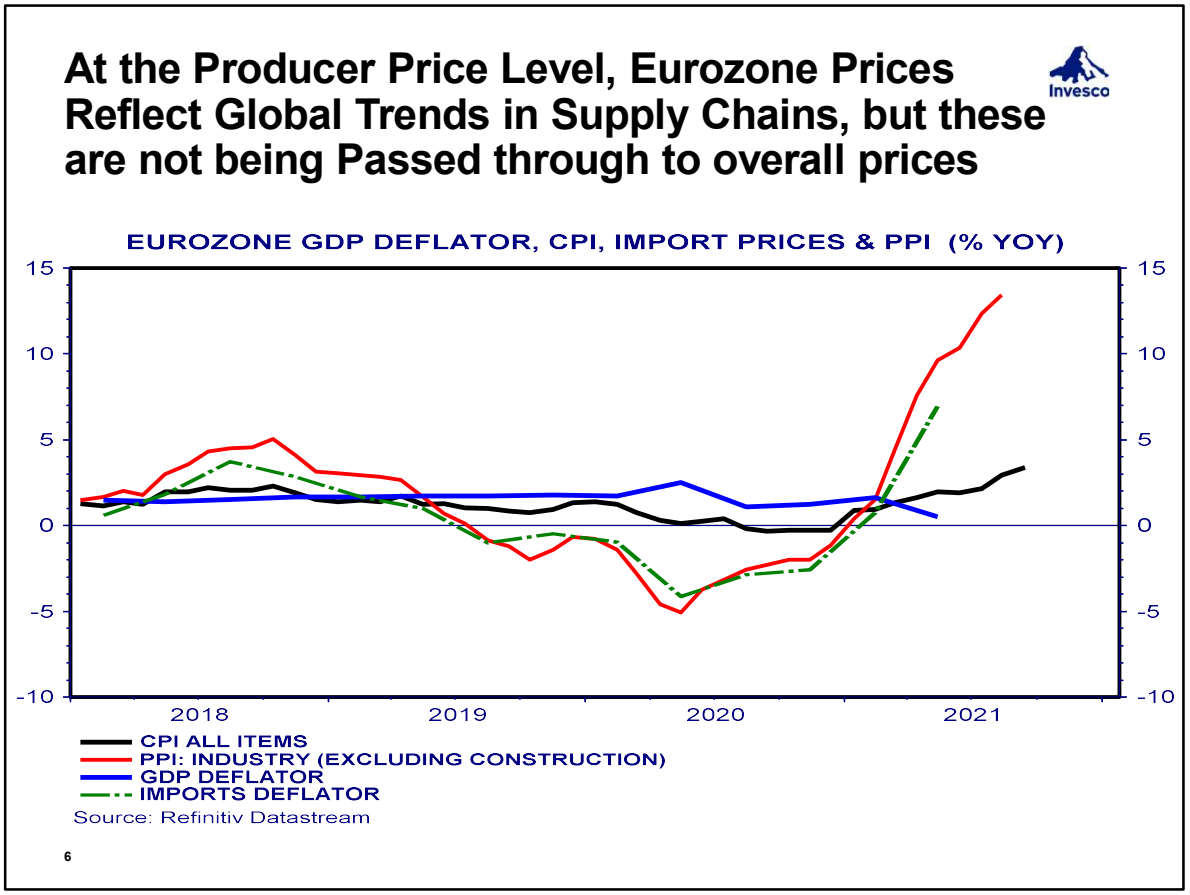
G5FLa



Turning to the Eurozone, we observe the same general trends as in the US – i.e., generally lower increases goods prices between 2000 and 2019 (averaging1.5% p.a.), with higher increases in service prices (averaging + 1.9% p.a. between 2000 and 2019). However, as in the US, this pattern has been reversed under the pressure of abrupt shifts in spending and demand due to the Covid-19 pandemic.

In September 2021 goods prices in the Eurozone increased by 4.6% year-on-year, while service prices (now available to October) increased at less than half that rate – by 2.1% year-on-year. The overall (harmonised) level of consumer prices – being a weighted average of these two main components -- increased by 4.1% in October.

G48S

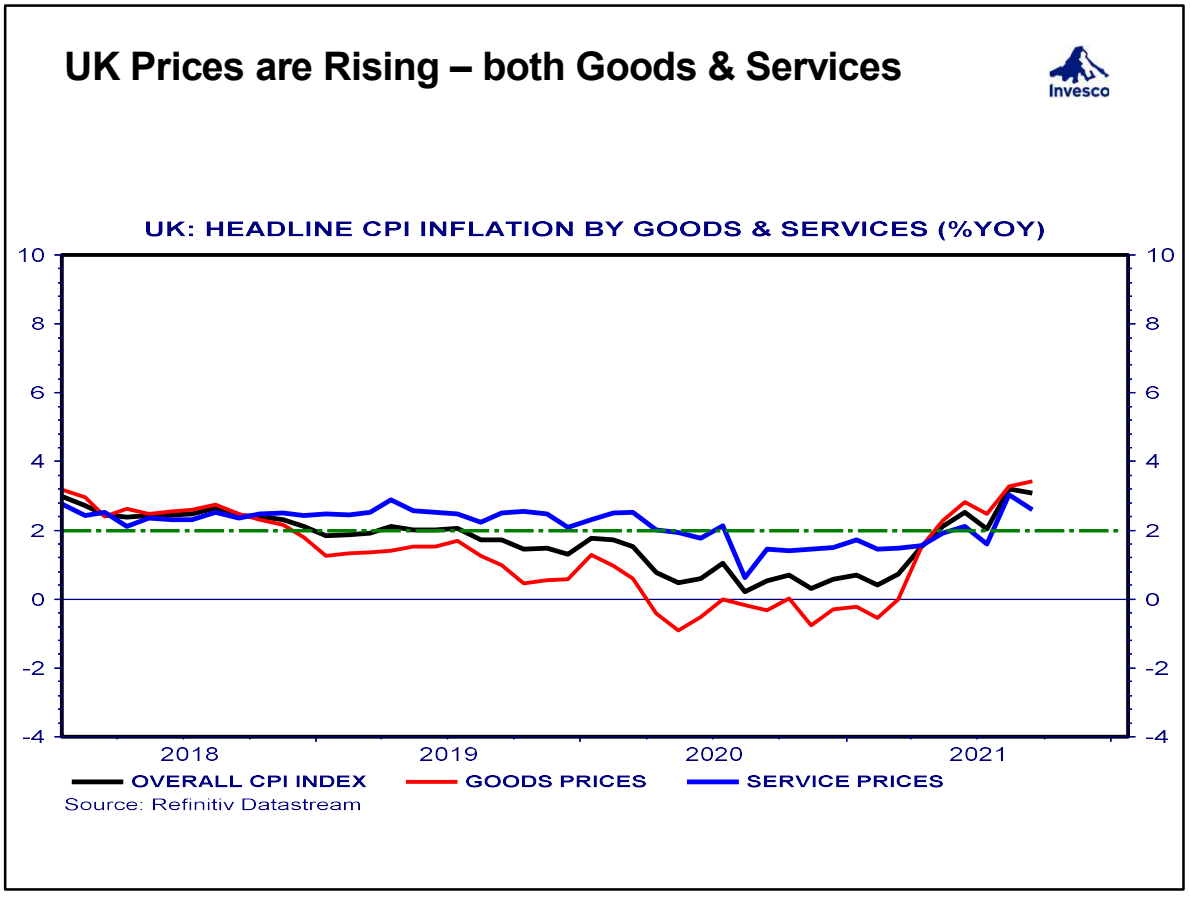


The same broad observations apply to Eurozone Producer Price Index as we saw for US producer prices, again in more exaggerated form. As shown in the chart above, prices of inputs (excluding construction goods, in red) had risen by 13.4% year-on-year in August. Import prices (in green) increased by 7.0% in 2021 Q2. The overall CPI was up by 3.4% in September, while the GDP deflator (in blue) in 2021 Q2 was up by only 0.5%.

The general rule, again, is that the narrower the price index and the closer the items are to the first or early stages of the production process, the greater will tend to be the variability of prices. Conversely, the broader the price index and the closer the items included are to final consumer demand, the more stable prices are likely to be.

However, this observation is subject to whatever else is driving the overall or average level of prices in the economy, and readers will already have guessed that the main differences between the US and the Eurozone relate to the rates of broad money growth.

G4LY

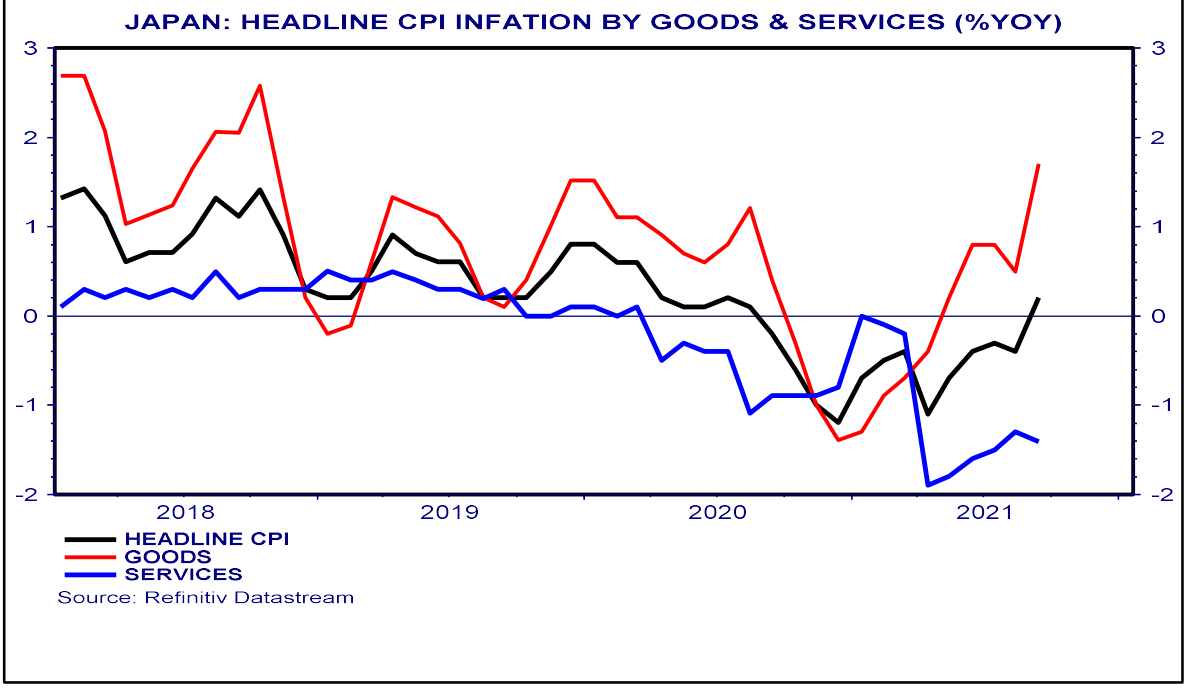


For completeness we check out the situation in the UK. While the breakdown of inflation between goods and service price inflation showed the same reversal that we observed in the US and the Eurozone between goods prices and service prices pre-pandemic and after the onset of the pandemic, in contrast to the US or the Eurozone, overall consumer prices, goods prices and service prices are all rising at fairly similar rates. The overall or headline CPI was up by 3.1% in September while goods prices were up by 3.4% and service prices were up by 2.6%.

There are perhaps two main reasons for the greater convergence of current price trends in the UK versus the US and the Eurozone. First, the UK has a much larger trade sector (imports are close to 35% of GDP) which means that imported goods play a larger role in the first round or pass through effects on pricing as compared with the more continental economies of the US and the Eurozone where imported goods account for a much smaller share of GDP. Second, because of the UK's large and highly integrated service sector (about 85% of GDP), the distinction between goods and service is sometimes less apparent than it might seem. All goods are sold with a degree of "bundled" services such as the service received at a department store or supermarket, while in the service sector "goods" are also widely available wrapped around with services – think of meals at restaurants or hotels.

G5NL

But Japanese Inflation has been Falling…

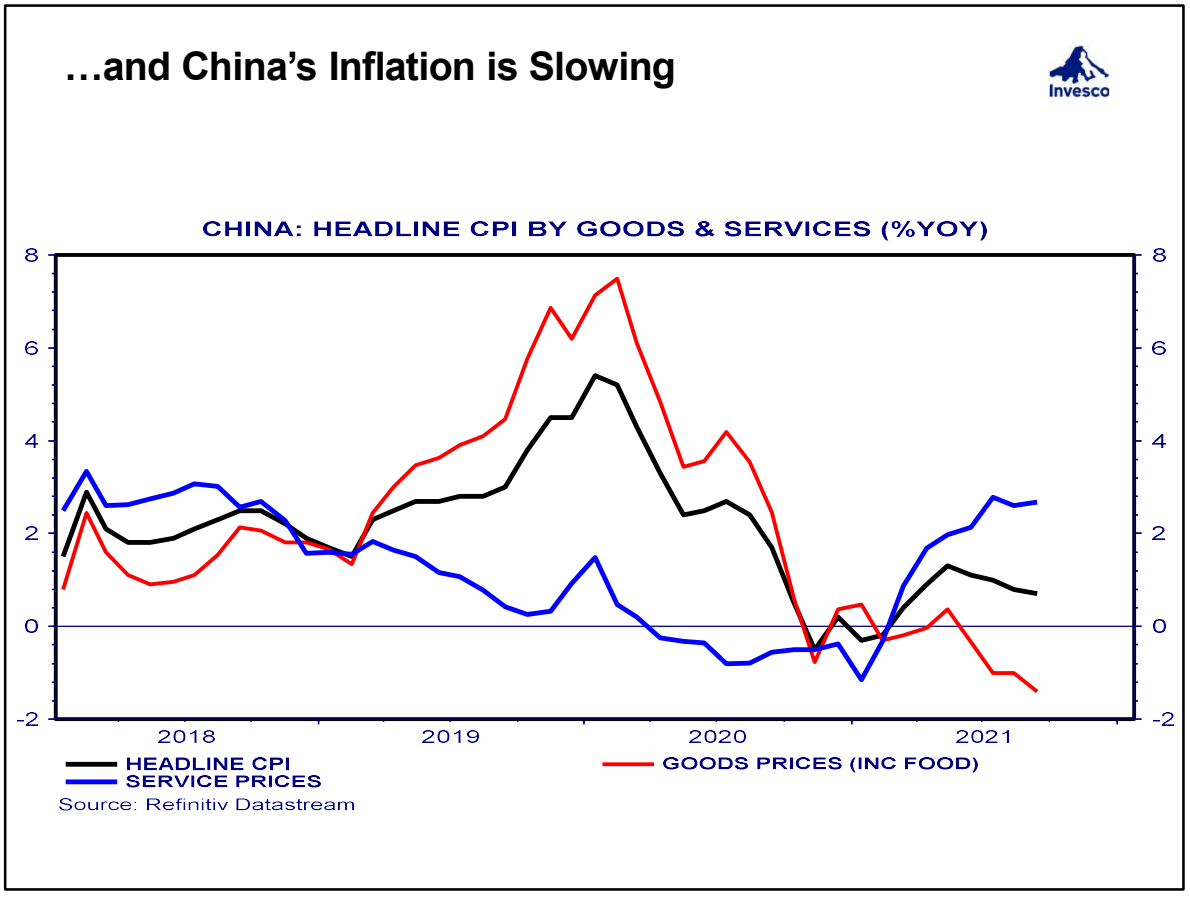


Switching our attention from North America and Europe to Japan and China, we immediately find some striking contrasts.

First, whereas elsewhere goods prices tended to fall while service prices increased between 2010 and 2019, in Japan the trends since 2010 (when goods and service subindices become available), were the opposite. Goods prices increased on average by+0.8% p.a. while service prices increased on average by only 0.2%. However, this period was distorted by two increases in Japan's consumption tax – (in 2014 to 8% and in October 2019 to 10% although some items such as food products and newspaper subscriptions were exempted and remained taxed at 8%). The overall CPI increased on average at 0.5% p.a. – a figure which includes the consumption tax hikes.

Second, the overall level of consumer prices in Japan at September 2021 increased by just 0.2% even though Japan is subject to many of the same global supply chain issues faced by Europe and the United States – i.e. shortages of electronic chips, shortages of cars, steel, coal etc and higher containerization and freight rates .

How can it be that Japan's inflation experience during the pandemic deviates so much from that of its advanced economy competitors, the US and the Eurozone? G5K6a

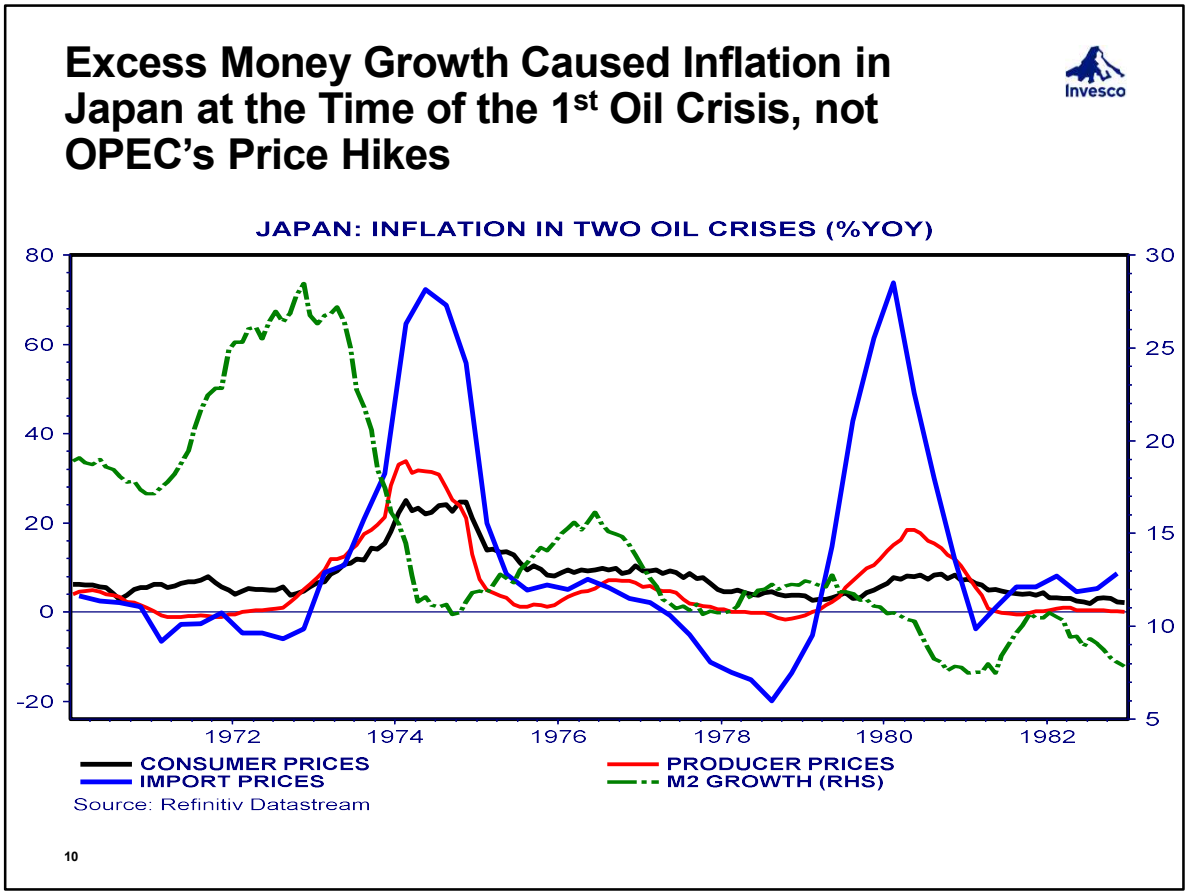


Turning now to China we see very different trends in terms of the overall price level and the components of the CPI.

First, the chart above shows China's CPI split into goods prices including food (in red) and service prices (in blue). The past three years have been dominated by the effects of Chia's swine flu outbreak which required the cull of large parts of China's hog herd. Since pigs constitute China's staple meat, this led to a huge increase in food prices in 2019-20. However, meat prices are now declining and on a year-to-year comparison basis they are likely to show a decline over the next year or so. Conversely, service prices, which had been generally sliding downwards in 2019-20, are now increasing at a greater rate than goods prices, in contrast to Europe and North America. This is surely evidence of a high degree of ***relative price*** flexibility in China.

But second, in marked contrast to what we see in the United States, the ***average or overall level*** of prices has remained very subdued, rising just 0.7% in September compared with a year ago.

GIV7j

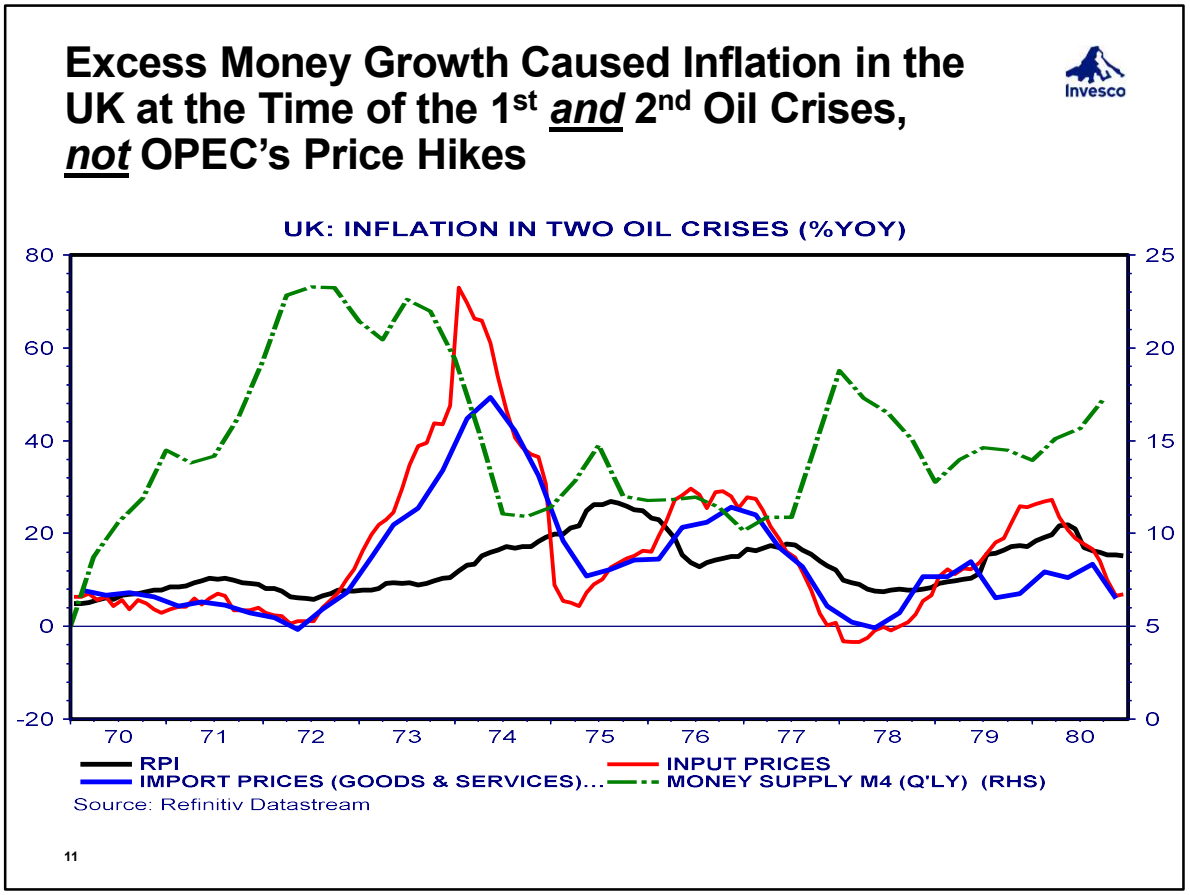


To develop a proper understanding of the underlying forces at work today and in the past, it is very useful to examine the experience of Japan, the UK and the US in each of the two oil crises of 1973-74 and 1979-80. I have chosen to focus on the two oil crisis deliberately to dispel the widespread myth that these two oil crises first caused inflation and subsequently precipitated recessions. As I shall show, nothing could be further from the truth.

First, consider the case of Japan. In the first oil crisis of 1973-74, import prices (which included all Japan's oil requirements) increased by 72.3% year-on-year in 1974 Q2. As we saw elsewhere, other wider price indices such as producer prices increased by lesser amounts, reaching a peak rate of 33.8% in February 1974. Similarly, consumer prices increased by an average of 23.2% in every month of 1974. This was a virulent episode of inflation, widely attributed to oil price increase by OPEC.

However, a more careful look at the data shows that from the break-up of Bretton Woods in August 1971, the Bank of Japan allowed or encouraged a rapid expansion of M2 money growth. They did this out of fear that yen appreciation would produce a recession in Japan's export-dependent economy. As is clearly shown by the green line in the chart above, the monetary expansion was large and long-lived, averaging 25.2% year-to-year between June 1971 and June 1973 – well before OPEC had raised the oil price. In the event, CPI inflation peaked in 1974 two years after the surge in M2 – exactly the timeframe that a monetary analyst would expect for the lag in effect. This was a monetary inflation; not an inflation due to disruption of oil supplies by OPEC.

Fast forward to 1979-80. This time Japan had learned its lesson. The Bank of Japan controlled money growth from 1974 onwards and no monetary excess was permitted in the late 1970s. As a result, in the 2nd oil crisis Japan's import prices increased by a similar amount as in 1973-74, but the PPI increased less and the CPI peaked at only 4%. Japan's success in dealing with the 2nd oil crisis was due to monetary control, not due to any better management of the supply chains. GIINd



The UK had notably less success in managing the 2nd oil crisis than Japan.

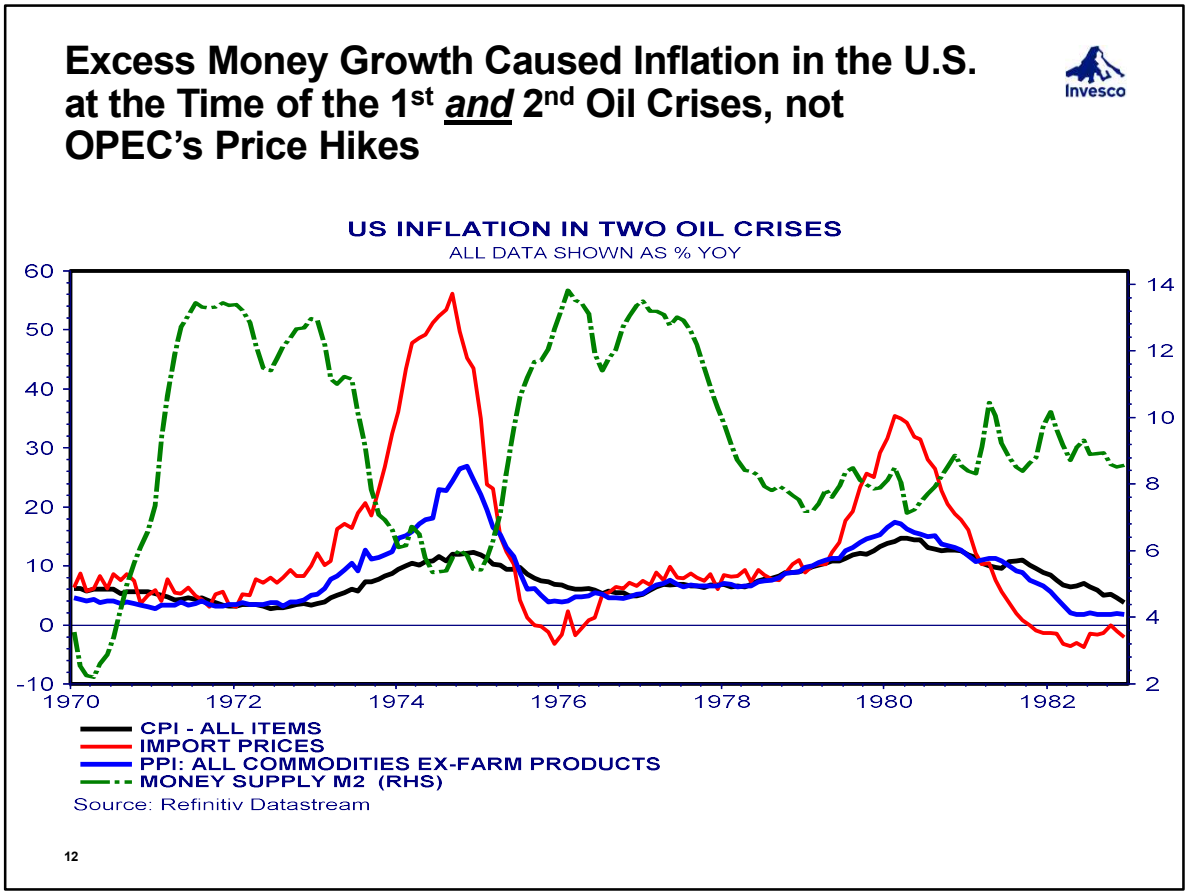
Like Japan after the breakup of Bretton Woods in August 1971, the UK authorities – the Chancellor of the Exchequer and the Bank of England together – presided over very rapid broad money growth averaging 19.4% p.a. between June 1971 and June 1973, with peak growth of 23% year-on-year in 1973 Q2 and Q3. When OPEC raised oil prices in the 1st oil crisis of November 1973, the monetary damage was already done. Input prices peaked at 73% year-on-year in January 1974, import prices peaked at 49.3% in 1974 Q2, and retail prices (the RPI) peaked at 26.9% in August 1975.

This was a disastrous episode of UK monetary mismanagement, exacerbated by the steep deceleration in money growth in 1974 which triggered the deepest post-war recession on record to that time.

Ahead of the 2nd oil crisis if 1979-80, the UK authorities had not been nearly as successful as their Japanese counterparts in controlling money growth. As a result, input prices increased by 27% in March 1980, and inflation measured by the RPI increased by 21.9% year-to-year in May 1980.

In contrast to the Japanese and especially the Bank of Japan, the UK and the Bank of England did not learn the lessons of the 1st oil crisis and the country was therefore compelled to repeat much of the previous trauma – economically and politically – during and after the 2nd oil crisis.

G0E1a



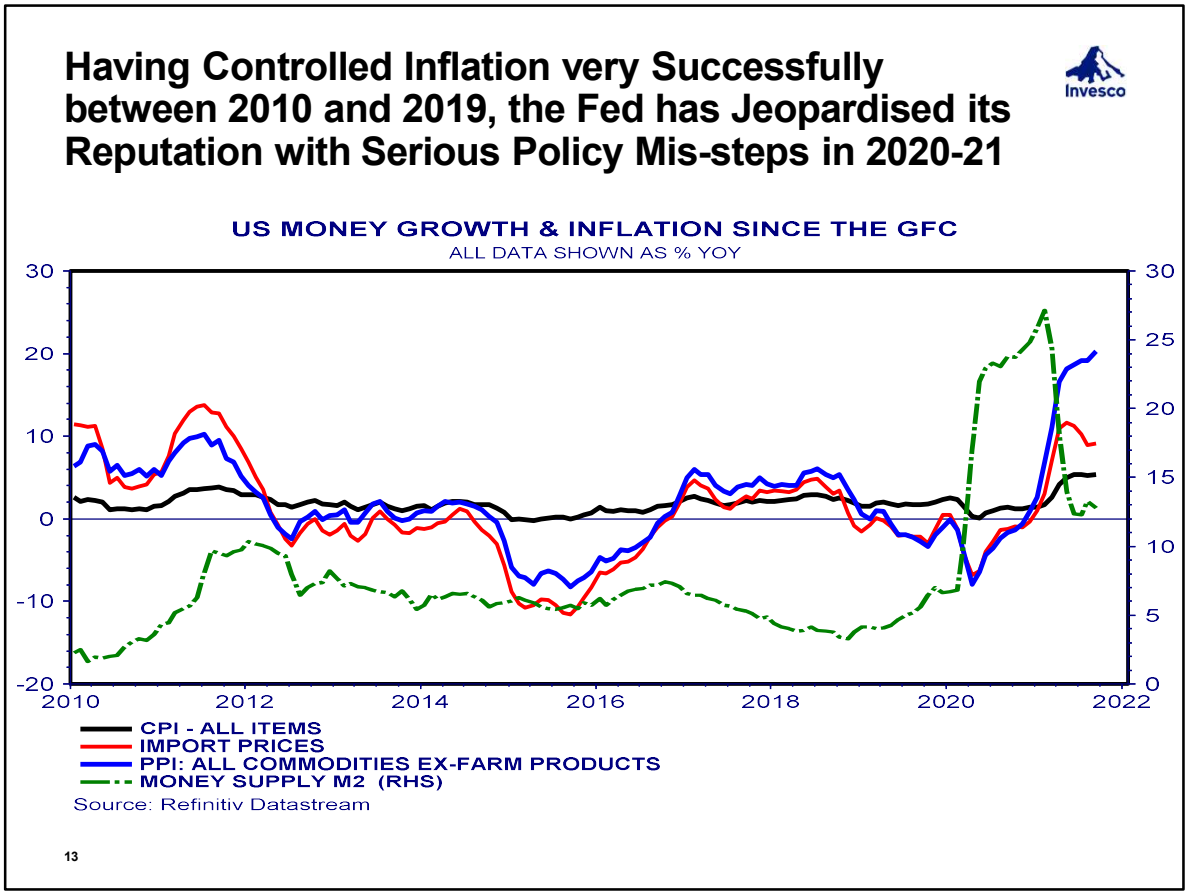
Compared to Japan and the UK, the US had even less success in controlling inflation in the 2nd oil crisis.

The reason, now that we have spelled out developments in Japan and the UK during the 1st and 2nd oil crises, is that, far from controlling M2 (or broad money growth) after the 1st oil crisis, the Federal Reserve and the US administrations of the 1970s simply repeated the same errors.

Between January 1971 and June 1973 US M2 growth averaged 12.1% year-to-year. Import prices including oil peaked at 56.2% in September 1974; the producer price index for all commodities except farm products also peaked at 26.9% in September 1974, while consumer prices peaked at 12.3% in December 1974, exactly two years after the secondary peak in M2 growth in December 1972.

Having seen the effects of high money growth on US inflation in 1973-74, one would have thought that the Federal Reserve would have prevented the recurrence of such an episode. However, as the chart clearly shows, M2 was allowed to re-accelerate from the start of 1975, rising to a peak growth rate of 13.8% a year later in 1976, and continued double-digit M2 growth persisted through to the end of 1977. By now it was too late to attempt to put the money genie back in the bottle and inflation resumed rising in 1978. This time import price peaked at 35.5% and the PPI peaked at 17.5% in February 1980. Consumer prices peaked at 14.7% in April 1980.

Interestingly, despite the inflationary experience of 1973-74, the peak of inflation in 1980 lagged just over three years behind the secondary peak of M2 in January 1977. As ***Milton Friedman always said, the lags from money growth to inflation are long and variable.*** G3DCd



Since the 1980s the attention to money growth among US academics, central bankers, business economists and others has been relegated to the status of a historical aberration. In the current, neo-Keynesian consensus that dominates professional economic debate there is seldom any mention of the quantity of money, and no use is made of the Quantity Theory of Money (QTM). Indeed, most Keynesian models of the economy do not even contain money, and they seldom contain any representation of the banking system – at most only interest rates or other credit market variables. Therefore in the Covid-19 pandemic, the Fed ignored any consideration of managing the quantity of money, preferring to emphasize its role in "easing financial conditions" or "restoring credit market functions".

This has meant that the quantity of money increased at a rate unprecedented since 1943. The consequences of the excess money growth in 2020-21 have steadily become evident in the economy – starting with the impact on asset markets, then economic activity, and more recently impacting inflation – exactly in the order and with the time lags predicted by monetary theory.

The reasons why central banks and academic economists have failed to incorporate money into their thinking are many, but they include: (1) a failure to study and understand the relation between money and nominal spending i.e., income velocity; (2) a failure to define adequately the most appropriate money stock that can be helpful in understanding the macro-economy (e.g. the Fed has long omitted large-sized CDs from M2, though why a deposit of $99,000 should be included but not a deposit of $100,000 is baffling); (3) an unwillingness to contemplate the existence of and justification for the long and variable lags between the growth of money and the consequences for spending or inflation, and (4) an associated preference for relating symptoms of money growth (e.g., commodity price changes or wage changes) to changes in inflation – in other words a preference for using reduced form models with seemingly higher short run correlations over understanding the true, underlying relationships. G3DCf

The Underlying Driver of Inflation is the cumulative *excess* of broad money growth, *not* supply chain issues

	US	UK	AU	EZ	NZ	CH	CN	JP	SW
Money Aggregate	**M2**	**M4x**	**M3**	**M3**	**M3**	**M2**	**M3**	**M2**	**M3**
Cumulative Money Growth: Feb 2020 to July 2021*	32.7	17.5	16.7	14.2	14.4	13.4	13.1	10.8	7.6
Potential Real GDP Growth Rate (rounded)	2.0	1.5	2.0	1.5	2.0	5.0	2.0	1.5	1.8
Measured Average Annual % Velocity Change, 1998-2020	-1.7	-1.9	-2.8	-2.3	-2.1	-2.9	-2.6	-2.7	-1.7
Excess of Money Available to Raise Price Level (based on 2 years of real GDP and velocity change)**	25.3	10.7	7.1	6.6	6.2	-3.6	3.9	2.4	0.6

*Except Canada where latest data was for June 2021. The nine economies are US, UK, Australia, the Eurozone, New Zealand, China, Canada, Japan and Switzerland.

** Allowing for two years of real GDP change and two years of trend change in velocity. In the final row, p = m + v – y' where p, m, v and y' are rates of change of the variables in MV=Py

Source: Refinitiv as at September 6, 2021 and Invesco calculations. G5JZh, GJ0T, AU12a, G5O6b, NZ03e, CH23a, CN56a, G58Tc, G4QZf

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In the table above we have calculated the cumulative monetary expansion (NB, this refers to "money in the hands of the public") in percentage terms between February 2020 and July 2021 (row 3), not "money on the books of the central bank".

The next step is to deduct (i) the amount of excess money that will be absorbed by real GDP growth (row 4) since GDP has to be financed, and (ii) the amount that is likely to be absorbed by changes in the demand for money balances, based on the trend of money holdings relative to GDP since 1997 (row 5). Since it is now nearly two years from the start of the pandemic and the move by central banks to very expansionary monetary policies, we subtract two years' worth of changes in these variables from the total increase in money.

The residual figures in the 6th row give us point estimates of the excess money balances in each economy (at July 2021) that still have to worked off in real growth, changes in money holdings, or in inflation. Again, given how little real GDP can be boosted and the long run stability of the public's demand for money balances, it should be abundantly clear that the US will have the highest inflation rate among these nine economies over the next 2-3 years.

The table highlights in yellow those economies that will see relatively higher inflation due to the relative oversupply of money, and in blue those economies that will experience unusually low rates of inflation as they emerge from the pandemic. The table relies on the proposition that ***"Inflation is always and everywhere a monetary phenomenon."***

The big concern for financial markets in 2022 will be how the Fed reacts. If the Fed succeeds in bringing M2 growth down slowly and gradually to 5-6% (from the September figure of 12.8% year-on-year – still about twice the required rate for reaching the 2% inflation target), the outcome could be benign (though with risks of high volatility). However, if FOMC members lose patience and react by raising rates suddenly and steeply (as in 1994-95), the sell-off in financial markets could be painful.

EPILOGUE -- or EPITAPH?

SENATE TESTIMONY, FEBRUARY 23, 2021

Senator Kennedy (Louisiana) : "…M2, the money supply, is up 26%, the highest amount since 1943. What does that tell you?"

Jerome Powell (Federal Reserve Chair) : "Well, when you and I studied economics a million years ago, M2 and monetary aggregates generally seemed to have a relationship to economic growth. Right now, I would say the growth of M2, which is quite substantial, does not really have important implications for the economic outlook."

Powell also claimed that "We have had big growth of monetary aggregates at various times without inflation, so something we have to unlearn, I guess."

What was the basis for this claim? Where and when has there been "big growth of monetary aggregates…without inflation"?