Rabobank

Wait and Red Sea: Gauging the Inflation Risks

Eurozone special

RaboResearch
Global Economics & Markets
mr.rabobank.com

Elwin de Groot
Head of Macro Strategy

Contents

Summary

- The Red Sea crisis continues, but container freight rates on some routes have now stabilised at a higher level, while cost increases have broadened out
- If sustained, higher logistics costs could still materially affect inflation in the Eurozone: we assess the potential impact from several angles – assuming no further geopolitical shocks
- Our base case assumes a 0.5%-points contribution to HICP over the next 24 months, but we provide a range of lower, and higher, estimates based on a number of plausible scenarios
- Higher inventories, supply-chain resilience, and soft demand may dampen any impact, while a stronger pickup in consumer spending and Europe-specific exposures may amplify this shock

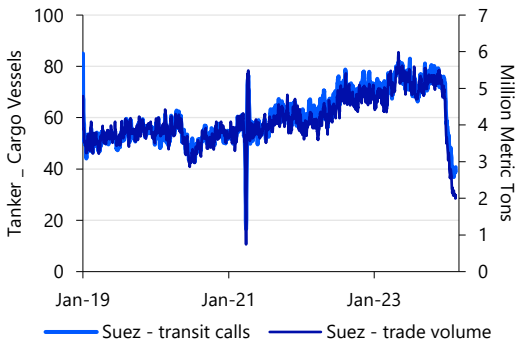
More stability? Far from it...

After noting that we are again 'In Deep Ship' last month, sadly the West's Operation Prosperity Guardian has not returned the Red Sea and Suez Canal to normal conditions. Higher insurance costs and risks to staff are hence forcing ocean carriers to continue to avoid both (Figure 1). Indeed, the regional situation remains delicate, with the risk of further military escalation.

For now, naval escorts are the only way limited numbers of Western ships can utilize Suez, which is a high-cost exercise: the EU is readying a naval mission of three ships, dubbed *Eunavfor Aspides*, but this is unlikely to be a gamechanger given the small scale of this mission compared to the density of commercial shipping in the region. As such, it seems likely that many ships will continue to take the detour around the Cape of Good Hope.

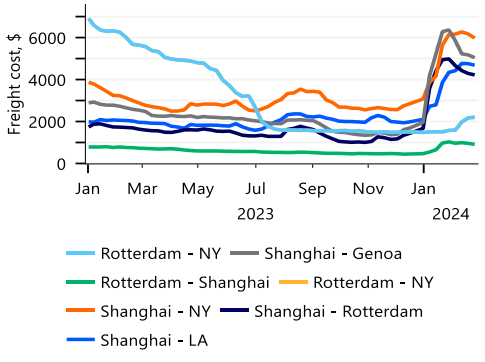
Longer travel times, and arguably opportunism of shipping companies have pushed up freight rates. In this report we look at the potential consequences for inflation.

Figure 1: The Red Sea keeps being avoided by Western and pro-Western carriers



Source: IMF PortWatch; 7-day moving average

Figure 2: Freight rates have eased slightly yet the price spike is broadening



Source: Macrobond

Freight Night

Maritime freight rates are exhibiting mixed trends in recent weeks. While Shanghai-Genoa and Rotterdam routes witnessed a slight easing, others, including to the US, have experienced upward pressure (Figure 2).

Going forward, more carrier supply coming on-line in 2024-25 could alleviate some strain – unless older, polluting vessels are scrapped at the same time ahead of (updated) EU Ship Recycling Regulations, implementing the requirements of the Hong Kong Convention, entering force on 26 June 2025 and the phasing in of ETS from 2024[1].

Yet issues with shipping containers could do the exact opposite. Containers are seeing disruption to their normal placement, with knock-on effects, as experienced during Covid. Some ports are suffering intermittent congestion due to the more irregular arrivals of ships due to the Red Sea crisis. Indeed, experts caution a comprehensive resolution to this crisis may take several quarters, and costs are likely to remain elevated – even absent further geopolitical shocks in the area. (We discuss a Middle-East war scenario here). Piracy risks along the African coast, and hence insurance costs, may also increase, as the head of the International Maritime Organisation warned last week.

Moreover, the ocean carrying capacity for key commodity cargoes such as Liquified Natural Gas (LNG) and Liquified Petroleum Gas (LPG) will not have the same positive ocean-carrier supply effect ahead: carrying capacity remains very tight there given the huge increase in journey times needed to go from the Middle East to Europe via South Africa.

This report does not assess the potential inflationary impact specifically flowing from the likes of higher diesel prices, but it is something we are watching closely.

Impact on HICP: but how much?

Although distribution costs typically determine some 1-1.5% of the cost share of most goods, a doubling or tripling of certain (container) shipping costs – as seen since October last year – could still have a material impact on importers' and producers' costs.

If a container holds 1,000 items, and the freight rate rises from $1,500 to $4,500 as just seen, that implies each item sees a $3 increase in price to cover this: the inflation rate depends on the price of the good: assuming a $100 item, that is 3%; for a $50 item, it's 6%, etc. In short, higher prices for transport over water could ultimately feed into higher consumer prices, even though it may be some time before they actually reach households and its extent depends on many other factors.

Indeed, whether wholesalers and retailers pass on these higher costs to households depends on many factors, such as alternatives (either in transport modality or product), inventory levels, and - more generally- the demand situation.

Our methodologies

One of the key drivers of the surge in goods prices in 2021-22 was the disruption of global supply chains and the clogging up of distribution over water *and* land. With that experience in mind, we follow three approaches to gauge the Red Sea crisis' potential impact today:

1. The historical estimated impact of supply chain disruptions by way of a regression analysis of Eurozone inflation surprises (outcome vs. Bloomberg consensus) on both the NY Fed Supply Chain Pressure Index, (SCPI, see Box 1) and the aggregate index of container freight rates

[1] The maritime sector must start paying for CO2 emissions from this year onward: In 2024, ETS allowances are required for 40% of the emissions. In 2025, this increases to 70% of the emissions. And starting from 2026, 100% of the emissions must be covered. ETS allowances must be submitted by September 30th of the following year. So, for emissions in 2024, the allowances need to be arranged by September 30, 2025.

(WCI): this methodology assumes models and/or analysts didn't take such disruptions into account.

2. Explicitly adding the SCPI and WCI to a number of model specifications for core and/or ex-energy goods inflation to estimate its impact on overall inflation (assuming this improves its forecasting power);

The experience of 2021-22 shows that passthrough-effects to inflation were initially quite slow, but the unclogging of distribution chains actually came *quicker* than some pessimists had assumed. The ECB's bullish estimates/assumptions, with hindsight, actually proved fairly accurate[2].

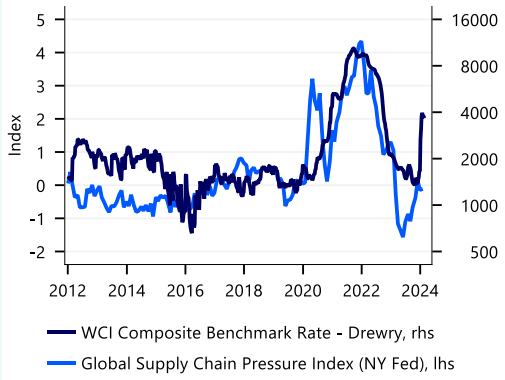
Our next step, then, is to look at three scenarios for the evolution of supply chain disruptions based on the WCI and SCPI and to what extent this would translate into Eurozone HICP, using the 'elasticities' found in the two approaches.

3. An input-output analysis looking at how and to what extent a shock in the distribution cost over water feeds through to other sectors, and hence product prices, taking into account potential substitution effects.

This third, alternative, approach, uses only the WCI on the assumption that this is an acceptable leading indicator of broader freight rates. This is then fed through an input-output table matrix.

Box 1 – The Drewry WCI and NY Fed SCPI

Figure 3: SCPI versus freight rate composite



Source: Macrobond, RaboResearch

In the first two approaches we use the Drewry Composite Index of container freight rates (WCI) as well as the NY Fed Global Supply Chain Pressure Index (SCPI), which is a broader gauge of supply chain disruptions than 'just' container freight prices (Figure 3); it also includes shipping 'rental' costs, bulk shipping (Baltic Dry) as well as data on order backlogs and supplier deliveries from (ISM) business surveys.

The SCPI, thus, is a broader measure with longer history but it is also more US-centred.

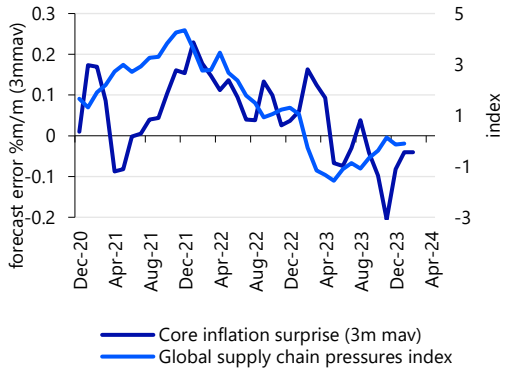
Between end-2021 and mid-2023 the situation in global supply chains progressively normalised. Indeed, the SCPI dropped below 0 ('normal') last year, because of comparison base effects, weaker global demand and more container vessels coming online. However, more recently it has veered up again to sit around zero in its most recent readings.

Approach 1

Inflation surprises in 2021-22 were largely due to markets underestimating the impact of higher European gas prices and supply-chain disruptions. The simple fact that oil rather than natural gas often featured in inflation models shows the economists who ran them overlooked both this key input and broader supply chain disruptions. Both, to be fair, were of a much smaller magnitude in the pre-Covid decades.

[2] In October 2021, ECB President Lagarde said that the ECB expected supply chain bottlenecks to last until at least 2022Q1 and that it would, overall, *"take a good chunk of '22 for it to be sorted out"*. By early 2023 the NY Fed supply chain pressures index had returned to earth.

Figure 4: Supply chain disruptions a driver of past inflation surprises?



Source: RaboResearch

To illustrate, figure 4 shows that core inflation forecast errors clearly correlate – albeit with a lag – with the SCPI.

In our analysis below we use the headline inflation surprises, as we believe they are a more reliable gauge (more respondents, timelier publication) for surprises.

Our first method finds that each point (permanent) increase in the SCPI leads to a 2.7ppt increase in Eurozone consumer prices (with a standard error of 0.4ppt), when we control for several other variables.

In an alternative specification where we use the WCI instead of the SCPI, we estimate that a permanent increase in freight rates of $1500/container leads to a 2ppt increase in consumer prices (with a standard error of 0.3ppt).

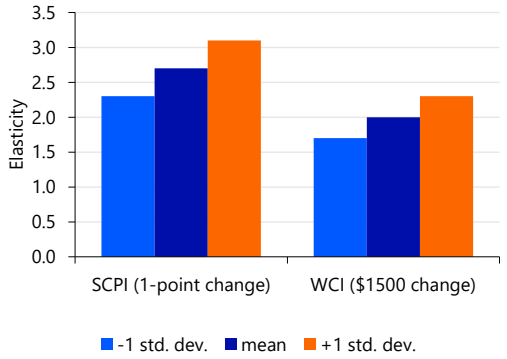
In both cases we find a considerable lag in the passthrough to HICP (forecast errors) of changes in either the SCPI or WCI. It takes at least several months before impact becomes visible at all and a 'maximum impact' is only reached after some 12-24 months. Appendix A-1 has more detail.

Approach 2

The second approach is to explicitly 'insert' the WCI or SCPI into the regular models we use for projecting core inflation. We test this with two variants, the first with Eurozone core inflation, the second using ex-energy goods prices. However, we find very similar results for both and so only report on the first variant.

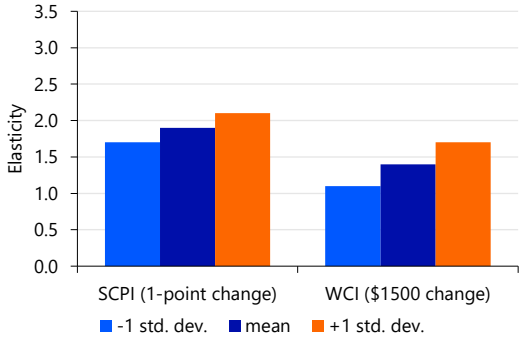
In this analysis we find that a permanent increase in the WCI of $1500 leads to a 1.4ppt increase in core HICP (0.4ppt standard error); a permanent 1-point increase in the SCPI leads to a 1.9ppt increase in core inflation with a 0.3ppt standard error.

Figure 5: Estimated impact (-1 and +1 standard deviation interval) on inflation (surprises)



Source: RaboResearch

Figure 6: Estimated impact (-1 and +1 standard deviation interval) on core inflation in model



Source: RaboResearch

These 'elasticities' are somewhat smaller than those found in the first analysis (see figure 5 and 6), in part because we only focus on core inflation[3]. Here too, it takes several months before any impact starts being felt by households. Appendix A-2 has more detail.

[3] We assume here that the impact on non-core components is similar, but it could be lower or higher (for example due to energy prices being affected by supply chain disruptions).

Scenarios

We can now entertain a number of future scenarios for the SCPI or WCI and use the elasticities obtained above for estimating an impact range[4]. We distinguish three cases:

A. **Improvement:** The Suez canal re-opens over the course of 2024 and problems progressively abate by the end of the year
B. **Status quo:** The Suez canal remains 'off limits' throughout 2024 and distribution costs stay elevated until at least early 2025
C. **Worsening:** The Suez Canal remains 'off limits' well into 2025. Problems broaden and distribution costs rise further. Normalization is not in sight by end-2024

Scenario A – 'Improvement'

- The Suez Canal re-opens over the course of 2024 as *Operation Prosperity Guardian* proves increasingly effective and/or Houthis halt their attacks due to an easing of Middle-East tensions
- Problems in logistic chains progressively abate and by the end of the year shipping prices have normalised.

Scenario B – 'Status quo'

- The Suez Canal remains 'off limits' for many ships and the situation in the Red Sea remains tense as naval operations do not succeed in enhancing the security situation
- Although shipping/distribution capacity increases over the course of time, this rise in capacity is absorbed by rising global demand
- Alternatively, although global demand stays weak, distribution capacity does not increase as projected, for example because shipping companies take old and dirty vessels out of service to replace them with 'greener' vessels
- The 'overshoot' in container prices does not correct quickly although prices start to decline by 2025 as logistic companies improve efficiency in handling cargo; the problem of containers sitting at the wrong places gradually eases.

Scenario C – 'Worsening'

- The situation in the Red Sea remains tense as naval operations do not succeed in enhancing the security situation; insurance premiums keep rising; the Suez Canal remains 'off limits' and for an increasing amount of ships, including Chinese or Russian flagged vessels that have maintained services so far
- Although shipping/distribution capacity increases over the course of time, this rise in capacity is absorbed by rising global demand
- Alternatively, although global demand stays weak, distribution capacity does not increase as projected, for example because shipping companies take old and dirty vessels out of service to replace them with 'greener' vessels
- The price increases broaden out to more shipping routes. Delays and disruptions increase in ports around the Cape of Good Hope. There have already been indications of that.
- Piracy around the African continent becomes an increasing problem as well. This may lead to higher freight insurance costs and/or the need for larger, more expensive, longer-term naval escorts for commercial shipping
- As more and more containers sit in the wrong places, challenges mount; normalization is not in sight by end-2024.

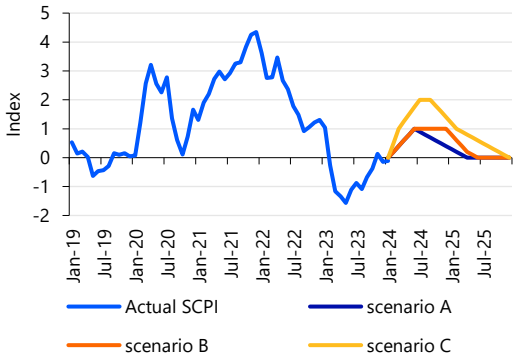
[4] We assumed that the latest SCPI readings do not take full account of the current situation and its passthrough effects yet. For example, the ISM survey plays a significant role in determining this indicator and: i) it will take more time before this becomes visible, whilst; ii) it may under-estimate the problems for Europe more specifically.

From scenario to inflation impact

In the next step we have translated the scenarios into three stylistic paths for the SCPI (figure 7) and WCI (not shown). We then fed these scenarios through the models estimated in approach 1 and 2. We show the average results in figure 8. Given the uncertainties surrounding the estimates of the elasticities, we also show a low (minus 1 standard deviation) and a high variant (plus 1 standard deviation) for elasticities assumed. This gives us an impact range per scenario.

In a status quo scenario, HICP would rise by between 0.2 to 1.1 percent over a two year horizon (second column in figure 8). In a worsening Red Sea situation (third column), this could rise to 0.4 to 1.8 percent, which is quite significant.

Figure 7: Three scenarios for SCPI (stylistic)



Source: Macrobond, RaboResearch

Figure 8: Estimated impact on inflation

Impact on prices on a 2y horizon (average of method 1 and 2)

		Scenarios		
		A - Improve	B - Status quo	C - Worsen
Elasticity	Low	0.1	0.2	0.4
	Base case	0.3	0.5	0.9
	High	0.5	1.1	1.8

Source: RaboResearch

In terms of likelihood, we believe scenario A is too optimistic as things stand right now. Scenario B is more likely, but scenario C is definitely possible as well. As such, this analysis shows that there is also a significant chance that Eurozone inflation will be materially impacted in 2024-25.

This also implies that the ECB will have to include this in its risk assessment. A status quo scenario may still seem manageable (in part because the current disinflationary trend is the result of thawing supply chains during 2022-23) but a worsening of the situation could even upend the current disinflationary trend.

Alternative approach: input-output analysis

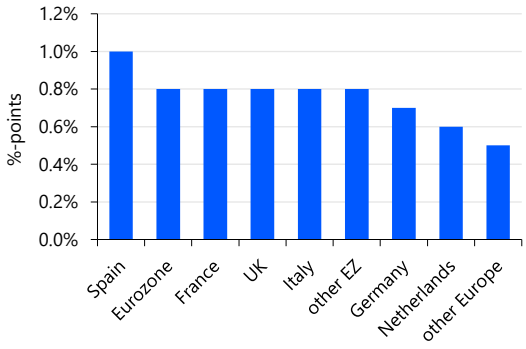
An alternative approach was used by our colleagues in the Netherlands economics team. They used an input-output analysis to estimate the passthrough of a price shock in one particular sector – maritime transport – on other sectors, by taking into account substitution effects.

The idea[5] here is that a price shock in maritime transport filters through to other sectors in the economy that use it, although businesses will try to find alternatives (which will then drive up prices of these alternatives, such as air transport).

They find that a 177% price shock to maritime transport costs – in line with what we have seen so far – when sustained for the rest of the year, would eventually add around 0.8% to HICP in the Eurozone as a whole. This is closer to the lower right triangle of results in figure 8.

[5] The prices are propagated across sectors through production functions of a sectoral producer. These functions process their intermediate input using a constant elasticity of substitution (CES) function, resulting in sectoral output along with the factor of 'labor.' In reality, this factor is a combination of capital and labor, although OECD tables do not further disaggregate it. The added value is attributed to this last factor, and its income accrues to a representative consumer per household, who then utilizes it for final consumption. The weighting of sectoral output in this final consumption measure is used to calculate the Consumer Price Index (CPI). They assume a 0.3 %-point impact on Dutch inflation, as explained here [in Dutch].

Figure 9: I-O analysis of a 177% price shock on water transport costs (through WCI)



Source: RaboResearch

Their analysis also gives some feeling for which sectors would be most strongly impacted by such a rise in maritime freight costs. Unsurprisingly, this includes water, air and land transport, but also sectors such as:

- Mining etc.
- Electricity sector
- Warehousing and support for transportation
- Manufacture of coke, refined petroleum
- Manufacture of (basic) metals
- Manufacture of Chemicals, non-metallic minerals, fabricated metal products
- Food, beverage and tobacco products

Factors softening or amplifying any impact

Of course it is not only the security situation in the Red Sea or the price of container transport that affects the future impact on HICP. Here we discuss a number of factors that may soften or amplify any impact from current supply chain disruptions.

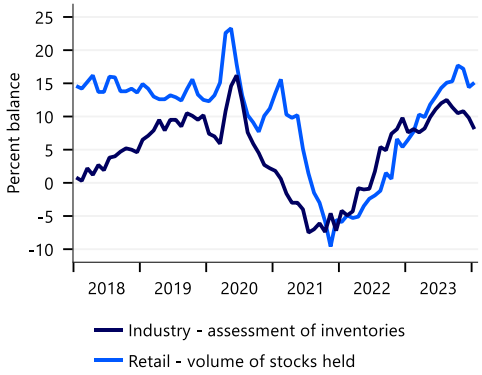
Softer impact

One argument that can be made is that inventories are significantly higher now than during the 2021-22 episode. As the global economy was recovering from the pandemic shock, a bullwhip effect amplified distortions as businesses started ordering more than necessary. Arguably this may not be the case this time around. German PMI surveys, for example, show that weak demand is currently outstripping higher cost of inputs and businesses seem happy to have lower inventories.

Companies have also learned the hard way and have taken measures in recent years to strengthen the resilience of their supply chains. 2020 was the year of rate cuts and QE, 2022-2023 saw significant rate hikes around the world and a gradual wind down of asset purchases. The higher interest environment leads to lower trade in investment goods and makes it more expensive to hoard inventories (and as such takes away incentives to 'over-order').

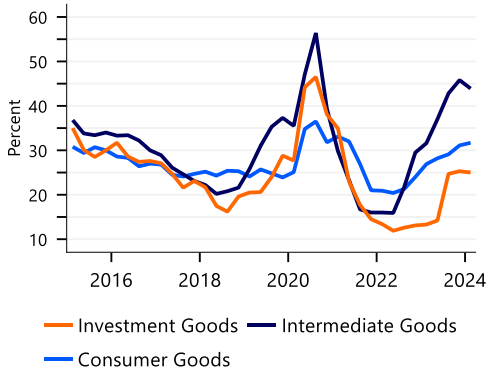
Global demand is also weaker now, which is particularly felt in the goods producing and exporting sectors.

Figure 10: A difference compared to 2021-22: inventories a lot healthier now



Source: Macrobond, EC survey

Figure 11: Demand as limiting factor for production (from EC survey)



Source: Macrobond

Bigger impact

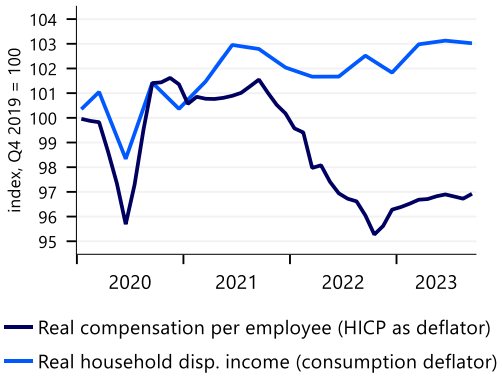
Of course a deterioration in the security situation in the region could make matters a lot worse, notably if other shipping routes were to be affected as well. Important to note in this respect is that Europe is more exposed to any disruptions in the Middle East region due to its geographical location and trade flows, than, for example, the US. So the US-centred SCPI may underestimate the problems that European companies are facing.

Diesel-import from the Middle-East and India is obviously at risk as well; Bloomberg reports that a shortage of oil tankers is a key risk given a 40-year low in large crude carrier deliveries. Although more container carrier supply should come on-line in 2024-25, alleviating some strain, older, polluting vessels are scrapped at the same time ahead of EU regulations.

Moreover, inventories and refinery capacity in Europe is already very low and diesel runs through the entire economy and hence feeds into the price of many goods as well as transportation services enforced from.

There is also the possibility that (global) demand recovers more rapidly. We expect Eurozone economic growth to stay weak in the near-term but improve over the course of the year. Yet consumer confidence has been on the rise in recent months. If the recovery in real wages becomes sustained this could also spur businesses to raise prices once again.

Figure 12: Households' real pay impacted, but their disposable income much less



Source: Macrobond, RaboResearch

There has been a lot of emphasis on 'real wages' since the energy shock, but what is often overlooked that compensation policies by governments alleviated that shock quite a bit. This is illustrated in figure 12. Consumer confidence has been on the rise since end-2022.

That could also mean that, as real disposable incomes rise faster, demand may rebound more quickly than currently expected.

If consumption accelerates, bear in mind that a lot of the stuff comes in containers from China.

Conclusions

The Red Sea crisis continues. Container freight rates have come of their peaks on some routes, but they remain very high and cost increases have broadened out. If sustained, higher logistics costs could still materially affect inflation in the Eurozone: we assess the potential impact from several angles – assuming no further geopolitical shocks.

Our base case assumes a 0.5%-points contribution to inflation (spread over two years), but we provide a broader range of lower, and higher, estimates based on a number of plausible scenarios. In a worsening Red Sea situation, the impact could increase up to 1.8 %-points, which would be quite significant – also from a monetary policy point of view.

Higher inventories, supply-chain resilience, and soft demand may dampen any impact, while a stronger-than-expected pickup in consumer spending and Europe-specific exposures may amplify this shock. It is hard to model non-linear or interaction effects with things such as energy prices, but it is a risk that cannot be dismissed entirely either.

Appendix A-1 – Inflation surprises analysis

Our first method regresses inflation surprises on an indicator of supply-chain disruptions (WCI or SCPI). The idea here is that the market did not really see this coming and did not (fully) include such factors into their models, either implicitly or explicitly.

The SCPI is defined as a standard deviation from the (zero) mean, but appears to be built from both level data as well as changes (such as from ISM survey questions). The WCI container freight index is in $ per container. The inflation surprises are a weighted average of surprises (actual minus median consensus estimate) for Eurozone HICP (first estimate) and for German, French, Italian and Spanish inflation. Data were taken from Bloomberg.

We tested various specifications. In a simple version we find that the change in the SCPI compared to two years ago, when lagged by 6 months, has an elasticity of 0.055 (*t*-value 6.14). When we use the WCI instead (also compared to its value 24 months ago), we find an elasticity of 0.00004 per $ (*t*-value 8.33), when lagged by 4 months. In both specifications we also added the log-change in the HWWI EUR energy price index (to reflect the possibility that the consensus under-estimated the energy, particularly gas price hump) as well as the forecast error in the previous month (to allow for 'learning behavior').

Both SCPI and WCI are very significant explanatory indicators of inflation surprises. The specification with the WCI actually has a better fit (adjusted R^2 of 0.41 compared to 0.25 for the SPCI), but the sample is shorter.

In a final specification we estimated a model with a 3rd degree polynomial distributed lag of the monthly change in both the WCI and SPCI. This not only improved the fit but also gives a better idea of the (long) impact lags involved. The table below shows the key regression results. Figure 15 shows the fit of the first model (with SCPI).

One could interpret the sum of the coefficients derived from the polynomial distributed lag as a long-run estimate of the elasticity. In other words, a 1-point permanent change in SCPI implies a 2.7ppt change in the inflation surprise (or, inflation versus 'baseline'). A $1000 permanent change in the WCI implies a 1.3ppt change in the inflation surprise.

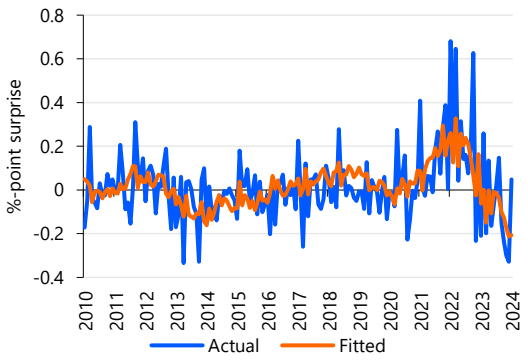
This analysis shows that recent *negative* inflation surprises may have been driven – again – by the thawing of supply chains since 2022, but it also implies that new positive inflation surprises could be on the cards if the Red Sea crisis persists and the consensus hasn't learned much!

Figure 13: Dependent: inflation surprise (actual minus median consensus estimate)

	Model 1: SCPI		*Model 2: WCI*	
	Coefficient	*t-value*	*Coefficient*	*t-value*
Constant	-0.015	-1.4	0.0007	0.1
Inflation surprise *t*-1	-0.235	-3.1	-0.334	-3.7
Δln(HWWI energy)*100	0.00255	2.3	0.00196	1.6
3rd degree PDL (lags 0 to 36)	2.6977	7.4	0.00133	5.8
- maximum at lag? (months)	22		14	
Sample:	Jan 2010 - Jan 2024		Aug 2014 - Jan 2024	
Adjusted R^2	0.348		0.439	
DW-statistic	1.98		1.98	

Source: Bloomberg, Macrobond, RaboResearch

Figure 14: Fit of model 1



Source: Bloomberg, Macrobond, RaboResearch

Appendix A-2 – Insert into the model

In this approach we explicitly add the SCPI or WCI to the model we regularly use to project core inflation[6]. This model is an augmented Phillips-curve model, where the log monthly change in core prices is determined by:

- Lagged (log) monthly changes in core prices
- A set of seasonal dummies including for Easter and Whit Monday
- The gap between the unemployment rate and the NAWRU
- A measure of long-run inflation expectations

Here, too, we experimented with several specifications. For the model with the SCPI we first used a version with the 24-month change in the SCPI (lagged by 5 months), for which some regression estimates are shown below. But eventually we decided to adding a 3rd degree polynomial lag of the change in the SCPI to the model. For the model with the WCI we used a simpler version with the 24 month change in the WCI lagged by 2 months.

Figure 15: Example regression with SCPI (dummies not shown)

Dependent variable: Δln(HICP core)		
	Coefficient	*t-value*
Constant	-0.00525	-2.2
Δln(HICP core) (t-6)	0.13044	2.1
Δln(HICP core) (t-12)	0.41138	6.3
U-U* (t-1)	-0.00019	-1.5
LT inflation expectations (t-1)	0.39655	3.2
SCPI(t-5) - SCPI (t-29)	0.00042	4.0
Sample:	Jan 2010 - Jan 2024	
Adjusted R^2	0.9512	
DW-statistic	1.93	

Source: RaboResearch

In both cases we find a statistically significant effect (at 95% confidence interval), although the *t*-values are generally somewhat lower than those found in the first approach.

Nevertheless, the analysis does show that including supply chain effects can significantly improve model forecasts .

Because of the lagged endogenous variables, we cannot simply 'read' the long-run elasticity directly from the model estimates[7].

Therefore we make forward projections with a base case and scenario and then derive the overall long-run elasticity.

We find that a permanent 1-point permanent change in the SCPI leads to a 1.9ppt increase in core HICP. For the WCI we find an elasticity of 0.9ppt for a $1000 increase in container freight prices. These are somewhat lower than those found in the first approach.

There could be several reasons for these lower elasticities:

- We are using core inflation (excluding energy, food, alcohol and tobacco), which is about 70% of the basket; if energy (or food) is affected more-than-average by supply-chain disruptions we could under-estimate its overall effect on HICP; this is supported by the I-O analysis (see p. 6) which shows that the impact is relatively high on sectors such as mining and electricity production as well as food and beverages.
- On the other hand could one argue that because core inflation is only 70% of the basket, the impact on HICP will be even smaller if non-core components are totally unaffected by supply-chain disruptions.
- The other variables in the model offset some of the impact if their coefficients change.

[6] Note that if that regular model produced inflation forecast errors similar to those made by the 'consensus' and adding an extra variable would not change the coefficients on the other variables, this method would -technically- be equivalent to the first method.

[7] By approximation it is the short-run elasticity divided by 1 minus the sum of coefficients on the lagged dependent variables. In the case of figure 15, this is 0.00042 x 24 x (1-0.54).

RaboResearch
Global Economics & Markets
mr.rabobank.com

Global Head

Jan Lambregts
+44 20 7664 9669
Jan.Lambregts@Rabobank.com

Macro Strategy

Global

Michael Every
Senior Macro Strategist
Michael.Every@Rabobank.com

Europe

Elwin de Groot
Head Macro Strategy
Eurozone, ECB
+31 30 712 1322
Elwin.de.Groot@Rabobank.com

Bas van Geffen
Senior Macro Strategist
ECB, Eurozone
+31 30 712 1046
Bas.van.Geffen@Rabobank.com

Stefan Koopman
Senior Macro Strategist
UK, Eurozone
+31 30 712 1328
Stefan.Koopman@Rabobank.com

Erik-Jan van Harn
Macro Strategist
Germany, France
+31 6 300 20 936
Erik-Jan.van.Harn@Rabobank.nl

Maartje Wijffelaars
Senior Economist
Italy, Spain, Portugal, Greece
+31 88 721 8329
Maartje.Wijffelaars@Rabobank.nl

Americas

Philip Marey
Senior Macro Strategist
United States, Fed
+31 30 712 1437
Philip.Marey@Rabobank.com

Christian Lawrence
Senior Cross-Asset Strategist
Canada, Mexico
+1 212 808 6923
Christian.Lawrence@Rabobank.com

Mauricio Une
Senior Macro Strategist
Brazil, Chile, Peru
+55 11 5503 7347
Mauricio.Une@Rabobank.com

Renan Alves
Macro Strategist
Brazil
+55 11 5503 7288
Renan.Alves@Rabobank.com

Molly Schwartz
Cross-Asset Strategist
+1 516 640 7372
Molly.Schwartz@Rabobank.com

Asia, Australia & New Zealand

Teeuwe Mevissen
Senior Macro Strategist
China
+31 30 712 1509
Teeuwe.Mevissen@Rabobank.com

Benjamin Picton
Senior Macro Strategist
Australia, New Zealand
+61 2 8115 3123
Benjamin.Picton@Rabobank.com

FX Strategy

Jane Foley
Head FX Strategy
G10 FX
+44 20 7809 4776
Jane.Foley@Rabobank.com

Rates Strategy

Richard McGuire
Head Rates Strategy
+44 20 7664 9730
Richard.McGuire@Rabobank.com

Lyn Graham-Taylor
Senior Rates Strategist
+44 20 7664 9732
Lyn.Graham-Taylor@Rabobank.com

Credit Strategy & Regulation

Matt Cairns
Head Credit Strategy & Regulation
Covered Bonds, SSAs
+44 20 7664 9502
Matt.Cairns@Rabobank.com

Bas van Zanden
Senior Analyst
Pension funds, Regulation
+31 30 712 1869
Bas.van.Zanden@Rabobank.com

Paul van der Westhuizen
Senior Analyst
Financials
+31 88 721 7374
Paul.van.der.Westhuizen@Rabobank.com

Cas Bonsema
Senior Analyst
ABS, Covered Bonds
+31 6 127 66 642
Cas.Bonsema@Rabobank.com

Agri Commodity Markets

Carlos Mera
Head of ACMR
+44 20 7664 9512
Carlos.Mera@Rabobank.com

Michael Magdovitz
Senior Commodity Analyst
+44 20 7664 9969
Michael.Magdovitz@Rabobank.com

Paul Joules
Commodity Analyst
+44 20 7887 824436
Paul.Joules@Rabobank.com

Energy Markets

Joe DeLaura
Senior Energy Strategist
+1 212 916 7874
Joe.DeLaura@Rabobank.com

Florence Schmit
Energy Strategist
+44 20 7809 3832
Florence.Schmit@Rabobank.com

Client coverage

Wholesale Corporate Clients

Martijn Sorber	Global Head	+31 30 712 3578	Martijn.Sorber@Rabobank.com
Hans Deusing	Europe	+31 30 216 9045	Hans.Deusing@Rabobank.com
Neil Williamson	North America	+1 212 808 6966	Neil.Williamson@Rabobank.com
Adam Vanderstelt	Australia, New Zealand	+61 2 8115 3102	Adam.Vanderstelt@rabobank.com
Ethan Sheng	Asia	+852 2103 2688	Ethan.Sheng@Rabobank.com
Ricardo Rosa	Brazil	+55 11 5503 7150	Ricardo.Rosa@Rabobank.com

Financial Institutions

Short-term Interest Rates

Marcel de Bever	Global Head	+31 30 216 9740	Marcel.de.Bever@Rabobank.com

Bonds & Interest Rate Derivatives

Henk Rozendaal	Global Head Fixed Income	+31 30 216 9423	Henk.Rozendaal@Rabobank.com

Solutions

Sjoerd van Peer	Global Head	+31 30 216 9072	Sjoerd.van.Peer@Rabobank.com

Relationship Management

Rogier Everwijn	Global Head	+31 30 712 2440	Rogier.Everwijn@Rabobank.com
Rob Eilering	Banks	+31 30 712 2162	Rob.Eilering@Rabobank.com
Petra Schuchard	Insurers		Petra.Schuchard@Rabobank.com
Frank Dekkers	Asset Managers		Frank.Dekkers@Rabobank.com
Javier Alvarez de Eerens	MDB	+31 30 712 1015	Javier.Alvarez@Rabobank.com
Christel Kleinhaarhuis	Fintech		Christel.Klein.Haarhuis@Rabobank.com

Capital Markets

Laura Bijl	Global Head	+31 88 726 3254	Laura.Bijl@Rabobank.com
Christopher Hartofilis	Capital Markets USA	+1 212 808 6890	Christopher.Hartofilis@Rabobank.com
Ian Baggott	Capital Markets Asia	+852 2103 2629	Ian.Baggott@Rabobank.com
Willem Kröner	Global Head ECM	+31 30 712 4783	Willem.Kroner@Rabobank.com
Harman Dhami	DCM Syndicate	+44 20 7664 9738	Harman.Dhami@Rabobank.com
Crispijn Kooijmans	DCM FIs & SSAs	+31 30 216 9028	Crispijn.Kooijmans@Rabobank.com
Bjorn Alink	DCM Securitisation & Covered Bonds	+31 30 216 9393	Bjorn.Alink@Rabobank.com
Othmar ter Waarbeek	DCM Corporate Bonds	+31 30 216 9022	Othmar.ter.Waarbeek@Rabobank.com
Joris Reijnders	DCM Corporate Loans	+31 30 216 9510	Joris.Reijnders@Rabobank.com
Brian Percival	DCM Leveraged Finance	+44 20 7809 3156	Brian.Percival@Rabobank.com

Disclaimer

Non Independent Research

This document is issued by Coöperatieve Rabobank U.A. incorporated in the Netherlands, trading as "Rabobank" ("Rabobank") a cooperative with excluded liability. The liability of its members is limited. Authorised by De Nederlandsche Bank in the Netherlands and regulated by the Authoriteit Financiële Markten. Rabobank London Branch (RL) is authorised by De Nederlandsche Bank, the Netherlands and the Prudential Regulation Authority, and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Further details are available on request. RL is registered in England and Wales under Company no. FC 11780 and under Branch No. BR002630. This document is directed exclusively to Eligible Counterparties and Professional Clients. It is not directed at Retail Clients.

This document does not purport to be impartial research and has not been prepared in accordance with legal requirements designed to promote the independence of Investment Research and is not subject to any prohibition on dealing ahead of the dissemination of Investment Research. This document does NOT purport to be an impartial assessment of the value or prospects of its subject matter and it must not be relied upon by any recipient as an impartial assessment of the value or prospects of its subject matter. No reliance may be placed by a recipient on any representations or statements made outside this document (oral or written) by any person which state or imply (or may be reasonably viewed as stating or implying) any such impartiality.

This document is for information purposes only and is not, and should not be construed as, an offer or a commitment by RL or any of its affiliates to enter into a transaction. This document does not constitute investment advice and nor is any information provided intended to offer sufficient information such that is should be relied upon for the purposes of making a decision in relation to whether to acquire any financial products. The information and opinions contained in this document have been compiled or arrived at from sources believed to be reliable, but no representation or warranty, express or implied, is made as to their accuracy, completeness or correctness.

The information contained in this document is not to be relied upon by the recipient as authoritative or taken in substitution for the exercise of judgement by any recipient. Any opinions, forecasts or estimates herein constitute a judgement of RL as at the date of this document, and there can be no assurance that future results or events will be consistent with any such opinions, forecasts or estimates. All opinions expressed in this document are subject to change without notice.

To the extent permitted by law, neither RL, nor other legal entities in the group to which it belongs accept any liability whatsoever for any direct or consequential loss howsoever arising from any use of this document or its contents or otherwise arising in connection therewith.

Insofar as permitted by applicable laws and regulations, RL or other legal entities in the group to which it belongs, their directors, officers and/or employees may have had or have a long or short position or act as a market maker and may have traded or acted as principal in the securities described within this document (or related investments) or may otherwise have conflicting interests. This may include hedging transactions carried out by RL or other legal entities in the group, and such hedging transactions may affect the value and/or liquidity of the securities described in this document. Further it may have or have had a relationship with or may provide or have provided corporate finance or other services to companies whose securities (or related investments) are described in this document. Further, internal and external publications may have been issued prior to this publication where strategies may conflict according to market conditions at the time of each publication.

This document may not be reproduced, distributed or published, in whole or in part, for any purpose, except with the prior written consent of RL. By accepting this document you agree to be bound by the foregoing restrictions. The distribution of this document in other jurisdictions may be restricted by law and recipients of this document should inform themselves about, and observe any such restrictions.

A summary of the methodology can be found on our website