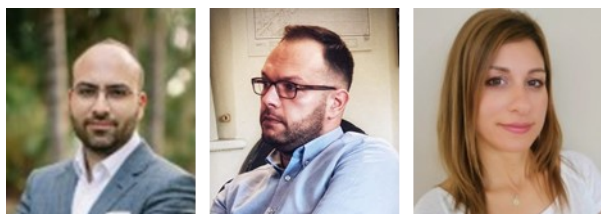


Shipping freight rates and inflation in the Euro Area*



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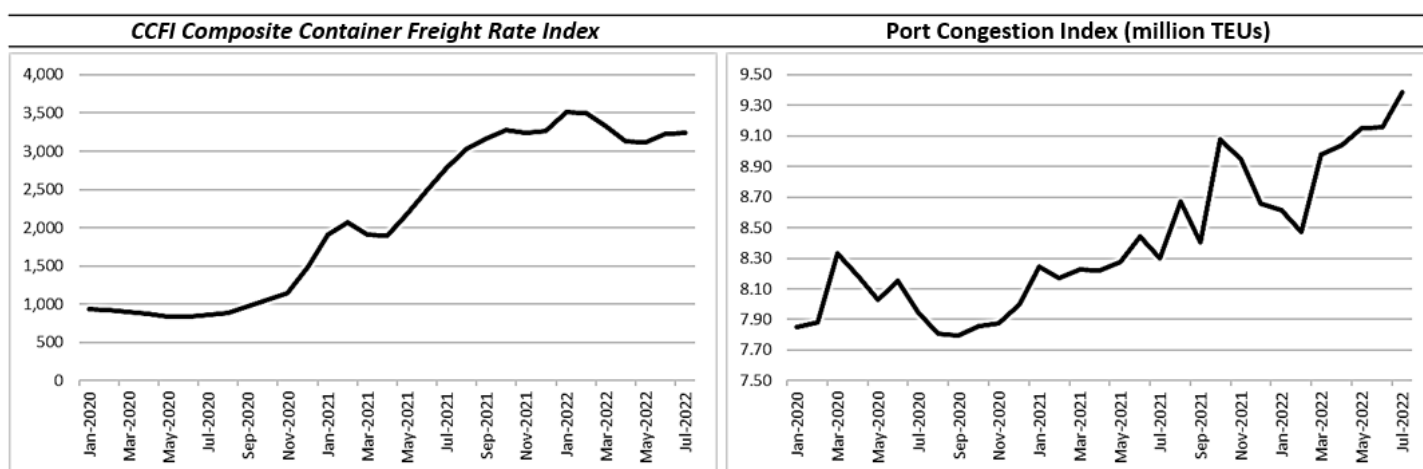
Consumer inflation across the globe rebounded in 2021, also as a result of supply side disruptions, one of which is the increase in freight costs. To elaborate on the relationship between inflation and shipping costs, we use disaggregated monthly data from January 2009 to August 2021, employing both constant tax inflation and the standard price indices. Following a shock in freight rates, the most hard-hit sectors appear to be garments and major household appliances, items that have traditionally been manufactured outside the euro area. In addition, when freight rates rise more than \$1,300-\$1,500 per day, the sensitivity of inflation to their changes increases.

*All views and opinions expressed are strictly personal and may not reflect the views of the institutions they are affiliated with.

1. Transport Costs and Inflation

Consumer inflation across the globe has rebounded much faster than expected, following the decline in 2020 triggered by the COVID19 pandemic. On the demand side, lockdowns and restrictive measures implemented across the globe led to pent-up demand and shifts in consumption patterns towards durable goods, with this mostly taking place via a move to online orders (Hall et al., 2021; Sheth, 2020). In addition, increased government spending further strengthened demand for goods.

On the supply side, the increase in energy prices in 2021 following their collapse in 2020 led to a double-digit increase in energy inflation. At the same time, the increase in online orders, coupled with supply chain disruptions because of the pandemic, led to port congestion and a subsequent increase in global container shipping freight rates, with transport costs rising to record highs. This rise was further exacerbated by limited airfreight capacity as international flight volumes plunged due to travel restrictions and flight cancellations.



The ongoing problems associated with freight costs relate with ports rather than the ships themselves. About 350 containerships capable of carrying almost 2.4m Twenty-Foot Equivalent Units (TEUs) are waiting off ports globally, with idle capacity reaching 4.6% of the global fleet, up from 3.5% in July 2021. Given that the maritime industry accounts for approximately 85% of the world trade, its importance on the world's economic growth cannot be overstated (Michail et al., 2021).

2. Freight Rates and Non-Energy Industrial Goods

In an effort to provide further insights on the relationship between freight rates and inflation, Michail et al., (2022) use disaggregated monthly EU data from January 2009 to August 2021 for the HICP inflation sub-component Non-Energy Industrial Goods (NEIG, thereafter), as obtained from Eurostat. The rationale behind the use of NEIG prices is that freight rates tend to have a strong impact on the category, given that it includes both intermediate and manufacturing goods, such as basic metals, chemicals and chemical products, machinery and equipment, and cars.

In particular, NEIG consists of three sub-components: (a) non-durable goods (e.g. electronic goods for personal care, pharmaceutical products, newspapers), accounting for 27% of NEIG; (b) semi durable goods (e.g. clothing and footwear, books, recreational equipment), accounting for 39% of NEIG; and (c) durable goods (e.g. cars, furniture, household appliances, PCs), accounting for 34% of NEIG. As per the ECB Monthly Bulletin (October 2008), imported consumer goods for final use represent a notable share of non-energy industrial goods at the euro area level.

The choice of the NEIG category is also supported by a UNCTAD (2021) simulation, which suggests that such items have the highest potential impact from a rise in containership freight rates. Higher freight rates expectedly have a greater impact on consumer prices of NEIGs, notably because these are more highly integrated into global supply chains (Lambert and Enz, 2017).

Nonetheless, given the large number of sub-categories under the NEIG (37), we propose the use of the major categories under it, namely those whose weight is close to, or more than, 10, using the 2021 weights. To put this in perspective, a weight of 10 implies a 1% effect on the overall HICP. This analysis yielded a total of 9 categories, as table 1 below indicates.

Table 1: Category Weights in NEIG Inflation

COICOP/GEO	Weight
CP0312 - Garments	38.54
CP0321 - Shoes and other footwear	10.52
CP0511 - Furniture and furnishings	20.34
CP0531_0532 - Major household appliances whether electric or not and small electric household appliances	9.98
CP0561 - Non-durable household goods	10.05
CP0611 - Pharmaceutical products	12.45
CP0612_0613 - Other medical products, therapeutic appliances and equipment	8.65
CP0711 - Motor cars	35.81
CP1212_1213 - Electrical appliances for personal care; other appliances, articles and products for personal care	17.54
IGD NNRG - Non-energy industrial goods	269.07
Share of top 9 in total NEIG	60.9%
Share excluding CP0321	57.0%

3. The extent of the impact

To examine the relationship between freight rates and inflation Michail et al., (2022) first employ a Vector Error Correction (VECM) setup, which elaborates on the long-run (equilibrium) relationship between the variables, using both constant tax and the standard HICP indices. The results suggest that freight rates have a significant positive impact on the sub-categories of Non-Energy Industrial Goods. Following a shock in freight rates, the most hard-hit sectors appear to be garments and major household appliances, items that have traditionally been manufactured outside the euro area. Furthermore, we note that the pass-through of higher freight rates to inflation is expected to have a, *ceteris paribus*, permanent impact on the affected inflation categories.

As it appears, non-linearities appear to be present in the data. After controlling for the 2021 effect on freight rates, the impact decreases significantly, with the inclusion of 2021 at times offering an almost 50% rise in the impact. To capture these non-linearities, we also use a threshold regression approach, with the results suggesting that the impact is disproportionately higher when freight rates increase. In particular, the findings suggest that the relationship between freight rates and inflation tends to become positive once the former rise above the \$1,200-\$1,500 levels, depending on the category.

Overall, on the basis of both methodologies, we find that the impact from the 250% (average) increase in freight rates in the January-September 2021 period on inflation in the NEIG category ranges from 1.25% to 2%. The respective impact on headline HICP inflation is more moderate and ranges from 0.3% to 0.5%, on the basis of a 25% weight of NEIG.

4. Freight rates, disruptions, and policy implications

Policy-wise, our results bare implications for the effect that supply chain disruptions can potentially have on the EU economy. The European Union as a whole does not appear to have been adequately prepared for such an event, especially given the fact that freight rates have historically been low. The lack of self-sufficiency when it comes to NEIGs, appears to have further increased inflation in the area, given that such a supply-side international shock may not be easily addressed with standard monetary policy response, that is, higher interest rates. This could potentially be an indication on the approach that the EU could focus its attention in the near future. More precisely, adequate self-sufficiency levels when it comes to NEIGs could prove quite useful in shielding the economy from inflationary shocks, so as to alleviate problems that have to do with supply chain disruptions.

Business-wise, the results extracted from our study imply that while just-in-time practices in warehousing are widely used these days (Ibrahim et al., 2015), a disruption in supply chain can have a domino effect in consumption, something that is more evident for the most commonly used goods such as garments and home appliances. As a response to this situation, the EU policymakers could act to reduce the bloc's reliance on outside manufacturers, perhaps in a manner similar to the EU Chips Act. This could also be a step to shield the bloc from high imported inflation and boost its self-reliance.

Finally, we highlight the fact that our paper, focuses on NEIGs and it does not take into account any second round effects on headline inflation nor any energy disruptions and volatility in oil and gas prices. Recent research concerning the disruptions of energy either due to supply chain operational problems due to the pandemic curfews (Yu et al., 2021) or the more recent war (Deng et al., 2022; Michail and Melas, 2022) have not been addressed in the current paper and will be a fruitful area for future research. ■

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