

III. Corporate vulnerability and the energy crisis

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Abstract: Energy costs have soared in the EU since summer 2021, linked to the post-pandemic recovery, the disruptive behaviour of Russia as supplier of gas, and the subsequent full-scale invasion of Ukraine by Russia. This energy cost shock has raised challenges for the European corporate sector. Member States have deployed support in various forms. The current support provided by Member States, however, raises concerns about fiscal costs, incentives for achieving climate goals and ensuring a level playing field. This chapter discusses challenges to the corporate sector's balance sheets. It reviews changes in energy prices paid by corporations and the implications of these changes on production costs. Simulations are carried out to assess differences across sectors in corporations' increased financial vulnerability under a (hypothetical) worst-case scenario in which firms do not adjust final prices. Results indicate that in this scenario, on aggregate, the increase in the share of financially vulnerable firms was similar to that associated with the COVID-19 pandemic, albeit with a different sectoral pattern: energy-intensive manufacturing and service industries were the most affected by high energy prices, with some impact also on food, accommodation, and retail. Available evidence, however, indicates that firms were generally able to charge higher final prices, including in less energy-intensive sectors, thus recouping higher energy costs. Overall, the analysis supports the phasing out of the existing support according to the plans, provided that there are no further energy price spikes, and ensuring that new support measures remain targeted and temporary.

III.1. Introduction

In autumn 2021 energy prices started to rise considerably after the drop recorded during the global recession linked to the COVID-19 outbreak. After Russia's invasion of Ukraine, gas prices skyrocketed, which also drove up electricity prices, as indicated in Chapter 2 of this edition of the QREA. Oil prices also increased substantially. Member States helped to alleviate the distress felt by households and corporations by introducing transfers, reduced VAT rates, price caps, and regulatory measures to limit the increase in the cost of energy or mitigate its impact. The European Commission mobilised resources and adapted legislation and surveillance frameworks in order to diversify oil and gas imports, accelerate the transition to renewable energy and increase energy efficiency ⁽⁹⁰⁾. The Commission has also provided Member States with guidance on possible measures to address household and corporate distress ⁽⁹¹⁾.

Since autumn 2022, energy prices have started to level out and current wholesale prices are well below the peak of August 2022. Nonetheless, energy retail and wholesale prices remain above those seen in the years preceding the pandemic, and there is substantial uncertainty as to future trends in wholesale prices, not least because of current geopolitical tensions.

This chapter aims to assess the impact of the energy cost shock on the financial health of the EU corporate sector, based on a sectoral disaggregation that enables us to assess to what extent corporate performance depends on energy intensity ⁽⁹²⁾. Implications of the energy cost shock for corporate balance sheets are assessed using simulations with firm-level data. These simulations evaluate the effect of higher energy costs (modelled as production cost shocks), without taking into account changes in other costs, the existence of support measures, changes in energy demand or changes in output. Moreover, for tractability, the final prices of goods are assumed to remain unchanged. The simulations can therefore be interpreted as providing a hypothetical worst-case scenario for the impact of the energy crisis on corporates' financial health. The results of these simulations indicate that, on aggregate, the increase in the number of financially vulnerable firms associated with the energy cost shock would be similar in magnitude to the

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⁽⁹⁰⁾ European Commission(2022): [Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - REPowerEU Plan](#), COM/2022/230 final.

⁽⁹¹⁾ European Commission (2021): [Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - Tackling rising energy prices: a toolbox for action and support](#), COM/2021/660 final.

⁽⁹²⁾ Throughout this study, energy intensity is defined as the share of expenditure on energy inputs out of the total value of output (i.e. direct use of energy inputs). Eurostat structural business statistics (SBS) data is used to compute the energy intensity of a given industry.

increase associated with the legacy of the COVID-19 pandemic ⁽⁹³⁾. However, although the COVID-19 legacy is mainly confined to a small subset of service industries – notably hospitality – the energy cost shock is felt the most in energy-intensive manufacturing. Clearly, relatively energy-intensive service industries such as hospitality and transport are also negatively affected due to their weak legacy balance sheets.

Available evidence indicates that firms were generally able to charge higher output prices, although the extent of pass-through has differed across industries and across firms within industries. Combined with the result of our simulations, evidence of pass-through would suggest a likely milder impact of the energy cost shock in terms of corporate vulnerability as compared to the COVID-19 legacy. However, the level of State aid approved for mitigating the energy crisis was above that granted for COVID-19. This higher level of approved State aid may in part reflect a pre-emptive strategy, given the systemic relevance of the shock (including a stronger impact on upstream industries). It could also be linked to relatively more support being channelled through State aid to COVID-19 support schemes. Another important factor is the historical gap between the aid approved and the aid finally disbursed. Overall, the analysis supports the March 2023 Eurogroup statement in favour of phasing out existing support, provided there are no further energy price spikes, and ensuring that any new support measures that may be necessary remain targeted and temporary, focused on the most vulnerable households and viable firms, while preserving incentives to limit energy consumption and increase energy efficiency.

The analysis includes all EU countries for which information is available. Restricting the sample to the euro area yields the same qualitative results ⁽⁹⁴⁾. The analysis consists of four steps. First, the implications of the surge in energy prices for production costs are documented – both direct cost increases and indirect effects via input-output linkages. Second, the results of the micro-simulations are presented, aimed at assessing financial vulnerability in different industries due to higher energy-related production costs, under the assumption of no change in other input costs and no change in output prices (zero pass-through to output prices). Third, preliminary trends in 2022 price-cost margins are presented, based on the available quarterly data. Finally, the policy implications of the results are discussed.

III.2. Energy prices and production costs

Since summer 2021, gas, electricity, and oil prices have surged in light of growing demand, linked to the post-COVID-19 recovery, the disruptive behaviour of Russia as supplier of gas and – most importantly – the full-scale invasion of Ukraine by Russia. Wholesale prices for energy have been particularly volatile. Retail prices paid by households and corporations have also soared in most Member States, broadly reflecting the wholesale price dynamics with some delay. The weighted-average pre-tax gas price for household users in the EU peaked in October 2022, having more than tripled compared to early-2021 levels; that for electricity more than doubled over the same period; and the price of refined oil products, such as gasoline and diesel, doubled at its peak in June 2022 (Graph III.3) ⁽⁹⁵⁾. A substantial reduction in wholesale gas and electricity prices has been recorded after the peak in August 2022; wholesale prices have decreased since December 2022. This was largely the result of higher-than-expected storage, linked to energy savings, the diversification of gas supply and a relatively mild winter. However, uncertainty remains about possible future increases in wholesale gas prices in case of stronger-than-expected drops in storage

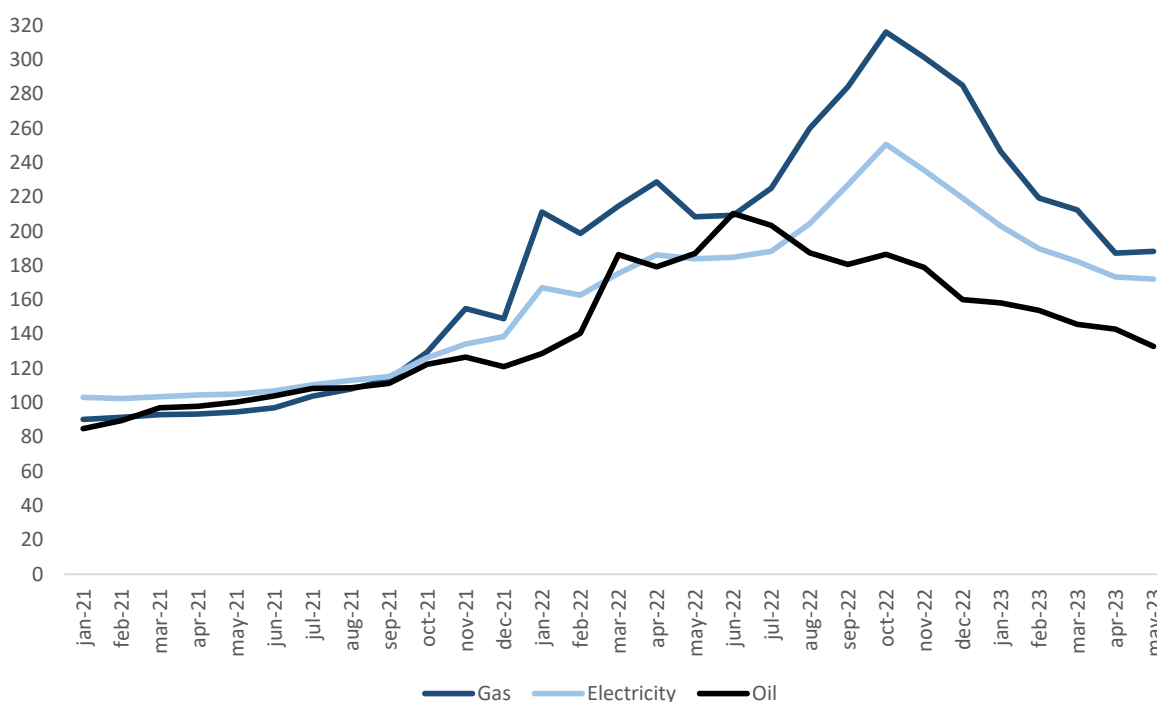
⁽⁹³⁾ The simulations carried out for COVID-19 partially consider public support. In particular, short-time work schemes, deferrals of interest and tax payments, and reduced cost of borrowing are considered, whereas grants to firms are not. The methodology for assessing the COVID-19 shock and its impact on corporate balance sheets is discussed in Archanskaia, L., P. Nikolov, and W. Simons (2022): [Estimates of corporate cleansing during COVID-19 using firm-level data to measure its productivity impact](#), QREA 21(2): 7-18. For the energy cost shock, it is assumed that firms can obtain the necessary financing (similar to loan guarantees), but that their borrowing costs are gradually increasing in line with monetary tightening and there are no payment deferrals.

⁽⁹⁴⁾ As shown in the companion analysis restricted to euro area countries: European Commission, ‘Corporate vulnerability and the energy crisis: challenges and policy responses.’ Technical note to the 18 April 2023 meeting of the Eurogroup Working Group.

⁽⁹⁵⁾ Energy price changes displayed in Graphs 1 and 2 are pre-tax and therefore do not account for the tax measures taken in response to the crisis. Changes in taxes over the period displayed in the two graphs contributed to reducing the effectively paid prices of gas and electricity for both household and non-household users. Yet, as such measures were largely temporary, volatile, and country-specific, their inclusion would have complicated cross-country and time comparisons. All interventions taking place before the taxation stage, such as price caps for certain types of users in some Member States, are accounted for.

in a context of reduced supply from Russia (96). Consequently, a reduction in household retail prices of gas and electricity can be observed after October 2022, largely linked to this decline in wholesale prices. Yet, according to the latest available data, pre-tax household retail prices for both gas and electricity in April-May 2023 remain significantly above the levels observed in the same months of 2021 (twice as high for gas, and 65% higher for electricity) (97). Moreover, retail prices appear to have stabilised at this higher level.

Graph III.1: EU27 household pre-tax retail prices of energy products (2019 average=100)



Source:

Energy prices paid by corporations in 2021-2022 also increased substantially, with significant variations between countries (with greater variations for retail prices than wholesale prices). The average (pre-tax) retail price for gas for non-household users more than doubled in most EU Member States between 2019 and 2022, and more than tripled in some of them (Graph III.2) (98). Price increases for electricity also varied widely between countries, while price increases for refined petroleum products were more uniform. Differences between countries in pre-tax energy price developments can be traced back to differing generation and distribution methods, different contract types and duration (affecting the extent to which wholesale prices feed into the retail prices effectively paid by users), and to regulatory measures and policies other than taxation for non-household users (99).

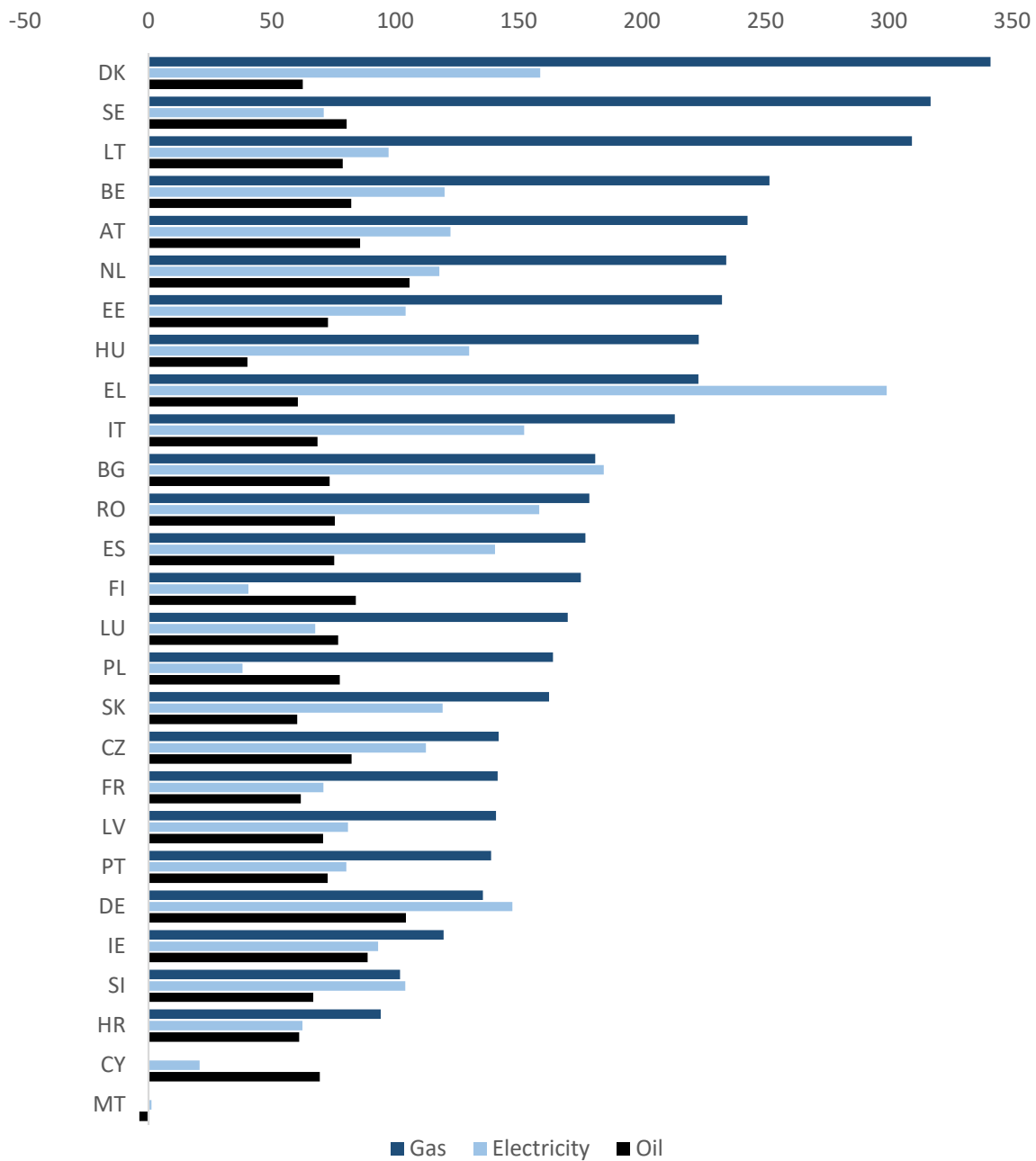
(96) Wholesale gas and electricity prices are available from S&P Global Platts. As of June 2023, gas (electricity) *wholesale* prices are 7% (28%) higher, and crude oil prices are 30% above the pre-crisis levels (January-June 2021). As shown in the projections reported in Annex 7 of the [Implementing REPowerEU Plan SWD](#), wholesale gas prices over the medium to long term are expected to remain at levels above those observed pre-crisis, with the price converging towards the global LNG price. Retail prices are expected to remain at a higher level in the medium term, also because they are expected to incorporate the cost of investment (e.g., additional gas terminal infrastructure). Yet, wholesale electricity prices are likely to fall in the long term, as the share of renewables grows and the role of gas as price-setter is reduced.

(97) See Chapter II in this issue of the QREA for a more detailed discussion of pass-through in electricity and gas markets in the EU.

(98) Graph 2 shows changes since 2019, i.e. a pre-COVID-19 average as benchmark for energy prices in light of the sizeable and temporary drop in energy prices observed in 2020, after the recession that followed the COVID-19 outbreak.

(99) Ari, A., N. Arregui, S. Black, O. Celasun, D. Iakova, A. Mineshima, V. Mylonas, I. Parry, I. Teodoru, and K. Zhunussova (2022): [Surging Energy Prices in Europe in the Aftermath of the War: How to Support the Vulnerable and Speed up the Transition Away from Fossil Fuels](#), IMF Working Paper 22/152; European Central Bank (2022): [Economic Bulletin 4/2022](#); World Bank (2022): [Energy Crisis: Protecting Economies and Enhancing Energy Security in Europe and Central Asia](#), Policy Note.

Graph III.2: Change (%) in EU-27 non-household pre-tax retail prices of energy inputs (2019-2022).

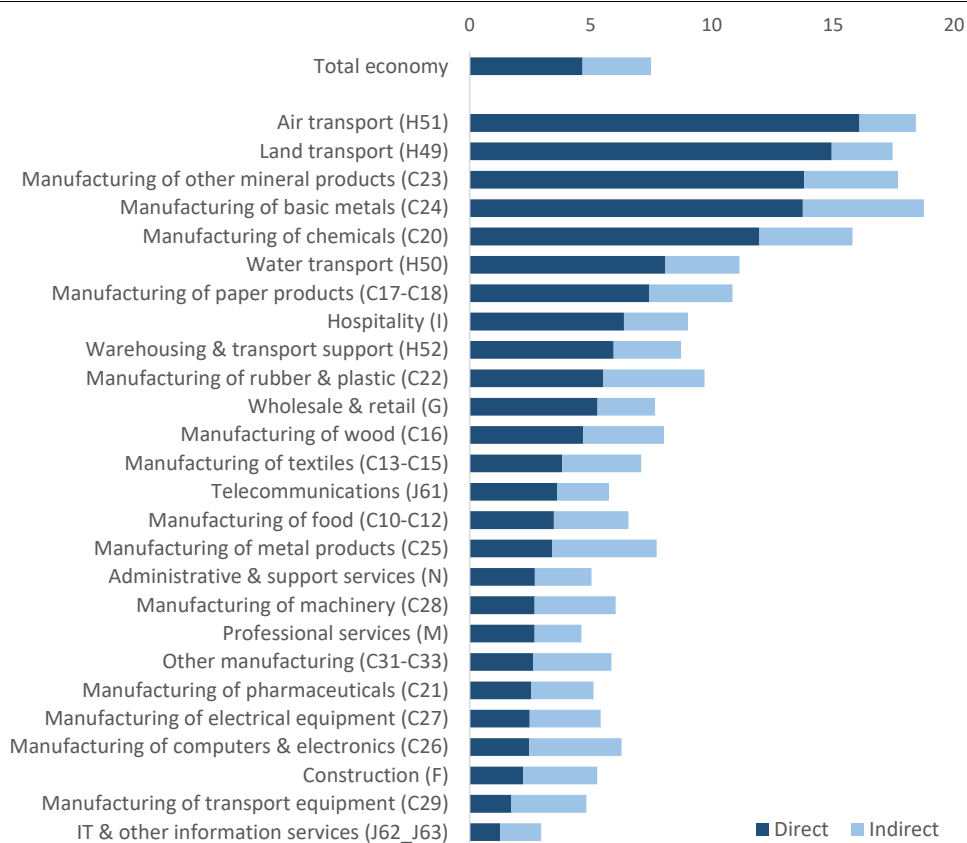


The non-household pre-tax prices include network and distribution costs but exclude taxes and excise duties. The label 'oil' refers to refined petroleum products. Data for gas and electricity are provided biannually and are reported until end-June 2022. The change is computed as the difference between the average price over 2019 and the price in S1-2022, and as such it excludes the price peak in the second half of 2022.

Source: Eurostat for gas and electricity prices; European Commission's Weekly Oil Bulletin for prices of refined petroleum products.

Graph III.3 shows for each industry the increase in material costs per unit of output, resulting from the increase in pre-tax retail energy prices between 2019 and 2022. Material costs increased most in industries with a strong direct reliance on energy. Such industries are found not only in manufacturing (mineral products, metals and chemicals), but also in a number of services, notably transport (especially air and land transport, but also water transport). Firms also use energy indirectly, as it is incorporated in other inputs

Graph III.3: **Change (%) in material costs linked to changes in energy prices, EU27 (S1-2019 - S1-2022)**



The graph shows the percentage change in the cost of the input bundle (material costs) as a consequence of higher energy prices, with the magnitude of the energy cost shock reported in Graph III.2. Material costs include all inputs used in production, whether primary (raw materials) or secondary (goods and services). The direct channel corresponds to the percentage change in total material costs associated with the direct use of energy in the industry, i.e. the energy cost shock weighted by the share of energy in material costs. The indirect channel corresponds to the percentage change associated with the indirect use of energy in the industry, i.e. through the use of energy in all the industries, of which the output is used as input in the production process of the industry considered. The latter channel is silent under zero pass-through (see footnote). Sectoral data are aggregated across countries according to the country-sector size (value added).

Source: Commission calculations based on Eurostat data and OECD (2021) Inter-Country Input-Output Database.

used in the production process. This indirect reliance on energy can be computed from input-output tables⁽¹⁰⁰⁾. As shown in Graph III.3, indirect reliance is on average smaller and more uniform across industries. It exceeds direct reliance in a subset of relatively downstream manufacturing industries (e.g. computers and cars).

⁽¹⁰⁰⁾ The computation combines the country-specific price increases (Graph III.2) with the country-industry-specific input shares of gas, electricity and refined petroleum products to obtain country-industry-specific energy cost shocks. Graph 3 aggregates the country-industry shocks to an EU aggregate by industry. The assumption of full pass-through is used to compute the magnitude of the indirect effect. Specifically, it is assumed that energy cost shocks translate into proportional increases in the price of each intermediate input (based on the share of energy in the material cost in the production process of that particular input), thereby increasing the price of each intermediate input used in a given industry. By contrast, under the zero pass-through assumption, only the direct effect is active. Under full pass-through, the sum of the direct and indirect effects gives the total change in the cost of the input bundle, and it provides an upper bound for the impact of the energy shock on material costs in each industry.

III.3. Impact on financial vulnerability: assessing a “worst-case” scenario through micro-simulations

Higher energy costs, if persistent and not (fully) matched by higher output prices, reduce profitability and can translate into losses, depletion of firms’ equity, an increased debt burden, and ultimately a higher risk of insolvency. Simulations of the impact of the energy cost shock on firm profitability and balance sheets were carried out using firm-level information from the ORBIS database ⁽¹⁰¹⁾. The results represent the highest possible potential increase in financial vulnerability in the EU corporate sector, or a worst-case scenario for the impact of the energy cost shock, because it is assumed that firms do not increase final output prices (i.e. zero pass-through) and do not reduce their demand for energy ⁽¹⁰²⁾. Public support is not considered in the simulation. Moreover, aside from soaring energy prices, the corporate sector has been affected by additional cost-raising factors, notably higher financing costs and tightened lending conditions, labour shortages and accelerating wages, higher prices of selected non-energy raw materials, and the persistence of post-COVID-19 bottlenecks affecting input prices, which are also ignored in the micro-simulations. The simulations do take account of the impact of COVID-19, however, because the 2022 baseline used to simulate the energy cost shock takes into account 2 years of the simulated effect of the pandemic on firm balance sheets ⁽¹⁰³⁾.

The simulations suggest that:

- For the economy as a whole, in this scenario in which firms do not adjust output prices and quantities, an additional 4% of firms would become financially vulnerable by end-2024, compared with a counterfactual scenario in which there is no increase in energy costs compared to the baseline (Graph III.4). This figure is comparable to the increase in the number of financially vulnerable firms associated with the COVID-19 legacy. Specifically, by end-2024 an additional 4% of firms are deemed financially vulnerable due to COVID-19, compared with a counterfactual scenario in which neither the COVID-19 nor the energy cost shocks occur (Graph III.5) ⁽¹⁰⁴⁾. A specific characteristic of the COVID-19 legacy is that smaller firms are more likely to remain financially vulnerable. For the economy as a whole, the share of turnover associated with financially vulnerable firms is about 2% in connection with the COVID-19 legacy, and about 4% in connection with the energy cost shock, which, therefore, tends to affect average-sized firms.
- Highly energy-intensive industries are most affected by the energy cost shock, both in the manufacturing (e.g. basic metals, other mineral products, chemicals and pharma) and the services (e.g. transport services, hospitality, wholesale and retail trade) industries. For services, the relatively weak

⁽¹⁰¹⁾ The simulation of the energy cost shock is carried out in the ORBIS database through the increase in firm-specific material costs, under the assumption of zero pass-through (i.e. only the direct channel is active). The country-industry-specific energy cost shock is computed as the increase in the pre-tax retail energy prices for non-household users between the first semester 2022 and the average price in 2019 (Graph 2), weighted by the share of energy inputs in production (Graph 3, direct effect). More precisely, the country-specific energy price shock together with the country-industry-specific share of energy inputs in total material costs (from input-output tables) is applied to the material cost bill of firms in ORBIS. Given that the share of material costs in total production costs varies across firms, the country-industry-specific material cost shock leads to firm-specific changes in overall production costs. The cost is assumed to remain at this level up to the end of 2024, which we consider as an approximation of the higher expected retail price in the medium term. The simulations assess the evolution of firms’ profits, liquidity positions, and balance sheets up to the end of 2024, under the restrictive assumption that sales and costs other than energy mimic firm-level outcomes observed before COVID-19. In the counterfactual scenario, the energy shock does not materialise, and firms revert to their pre-COVID-19 outcomes.

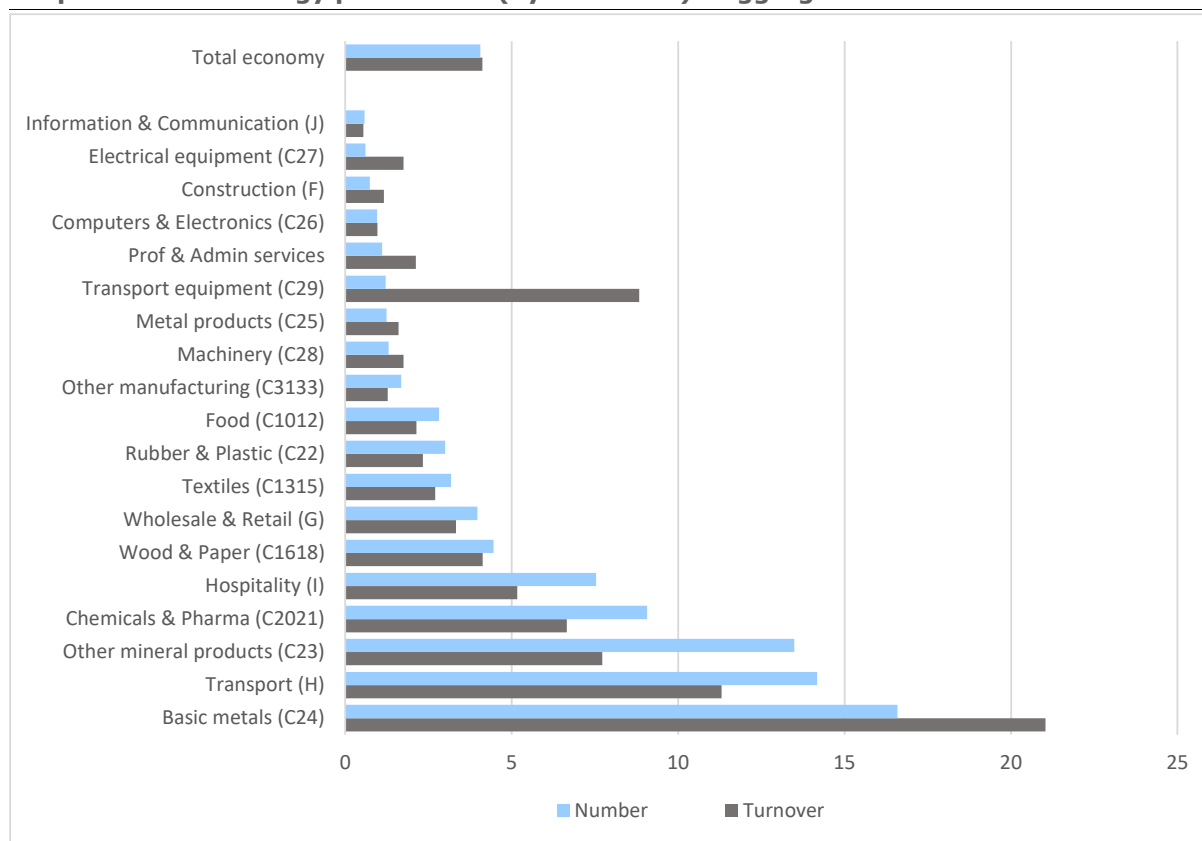
⁽¹⁰²⁾ Firms are identified as financially vulnerable if they have negative equity and/or a high debt burden (i.e. the firm is unable to cover debt servicing costs with operating profits and, on top of that, the firm is highly leveraged), by end of 2024. To be considered vulnerable, firms are also required to display a high risk of default by the end of 2024, according to a statistical criterion based on firms’ expected leverage, capitalisation, liquidity, and profitability (Altman Z-score model). See Archanskaia, L., P. Nikolov, and W. Simons (2022), *op. cit.*

⁽¹⁰³⁾ The use of pre-COVID-19 balance sheets is due to the lag in the availability of firm-level data, i.e. 2021 balance sheet information is incomplete at the time of writing. Further, the approach of simulating the two crises sequentially, on the basis of one set of firms, enables us to compare the magnitudes of the COVID-19 and the energy cost shocks in a controlled environment. For the description of the dataset, see Archanskaia, L., E. Canton, A. Hobza, P. Nikolov, W. Simons (2023), *The Asymmetric Impact of COVID-19: A novel approach to quantifying financial distress across industries*, European Economic Review, forthcoming.

⁽¹⁰⁴⁾ Therefore, compared to a hypothetical situation without the COVID-19 pandemic and without the energy cost increase, an additional 8% of firms are vulnerable by end-2024 as result of the pandemic and the energy crisis, adding to vulnerabilities (entry-exit dynamics) occurring in normal times.

starting level of balance sheets after the pandemic is also likely to play a role ⁽¹⁰⁵⁾. When measured in terms of their share in total sales of the industry, additional financially vulnerable firms in these service industries appear relatively small, whereas the opposite holds true for a subset of heavily affected manufacturing industries, e.g. in basic metals and in the manufacturing of transport equipment ⁽¹⁰⁶⁾.

Graph III.4: Increase (pp) in the share of financially vulnerable firms out of total firms in response to the energy price shock (by end-2024) - aggregate for available EU countries



The graph plots the share, by December 2024, of EU firms by sector that become financially vulnerable due to the energy cost shock, compared to a counterfactual with COVID-19 but without the energy cost shock. The blue bars display the number of additionally vulnerable firms relative to the total number of firms. The grey bars display the number of additionally vulnerable firms weighted by size (firm turnover) relative to the sectoral or economy-wide turnover. The sample covers 20 EU countries (AT, CY, DE, IE, LI, MT and NL are missing given data constraints).

Source: Commission calculations based on ORBIS database.

III.4. Changes in price-cost margins

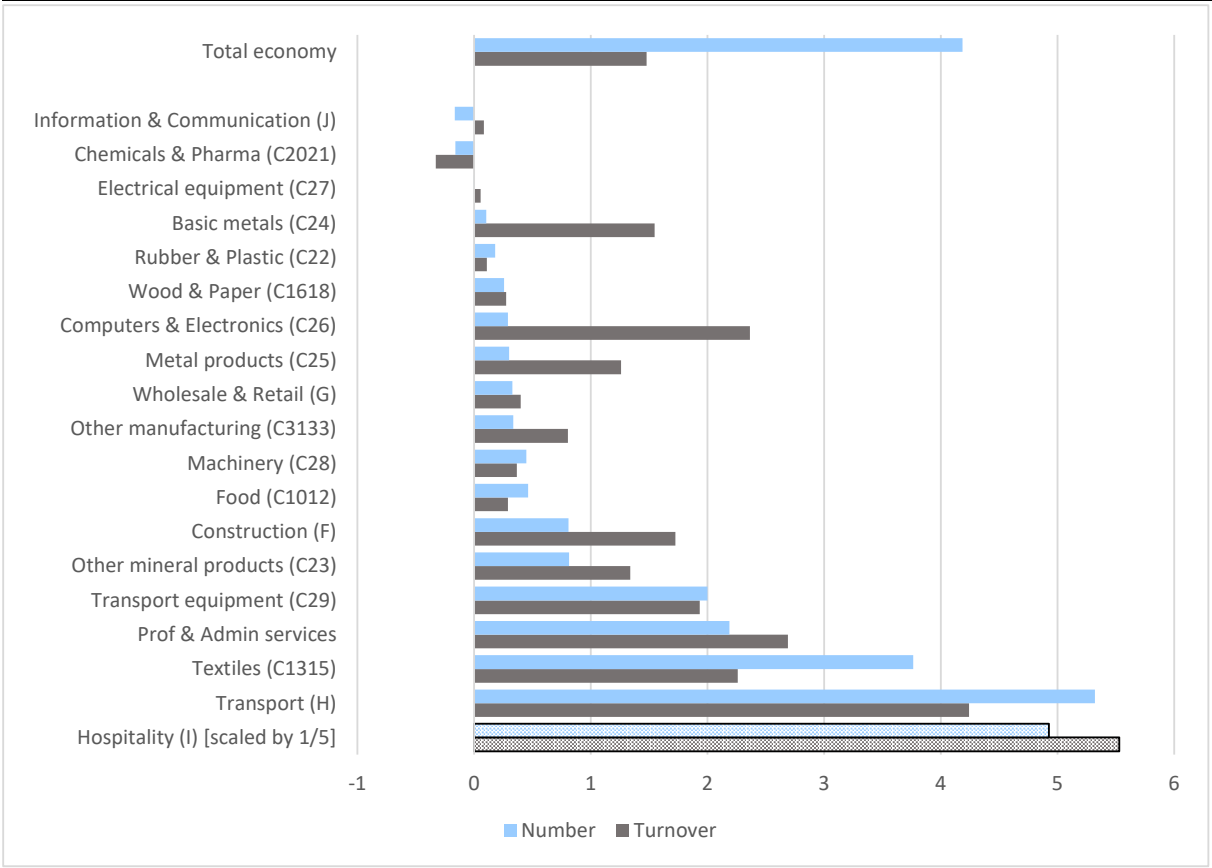
In contrast to the zero pass-through assumption underpinning the micro-simulations discussed above, the evidence suggests that firms were generally able to pass on - at least partially - the increase in production costs to output prices, although the extent of the pass-through appears heterogeneous across industries

⁽¹⁰⁵⁾ In the hospitality industry (I), e.g. after 2 years of the COVID-19 pandemic an additional 39% of firms appear financially vulnerable. In the absence of the energy cost shock, this share is reduced to 25% (-14 pp) by the end of 2024, whereas with the energy cost shock included the share stands at 33% (-6 pp).

⁽¹⁰⁶⁾ Following a similar approach, the EIB has analysed the impact of doubling corporate energy bills across the board. Assuming zero pass-through, this leads to an increase by 7 percentage points (pp) of the share of firms with negative profits, and by 2 pp of the share of firms with negative equity. See European Investment Bank (2022): [How bad is the Ukraine war for the European recovery?](#) Economics - Thematic Studies. The German Council of Economic Experts published simulations for an increase in gas (150-400%) and electricity (300%) prices, equally with a zero pass-through assumption, showing that this could imply negative profits for half of the firms in metals, and smaller increases in other sectors in Germany. See German Council of Economic Experts (2022): [Annual Report 2022/23 - Managing the energy crisis in solidarity, shaping the new reality](#), Chapter 5. In early 2022, the Bank of Spain published simulations for the impact of an energy price increase by 25%, showing that the share of firms with negative profits would raise by less than 10 pp. See Banco de España (2022): [Financial Stability Report Spring 2022](#), Box 1.4

and may also be heterogeneous across firms within industries ⁽¹⁰⁷⁾. This study uses quarterly data on output deflators and labour costs in each country and industry, available from Eurostat short-term business statistics (STS), to evaluate the extent to which cost increases appear to have led to, or cover, price increases in 2022 ⁽¹⁰⁸⁾.

Graph III.5: Increase (pp) in the share of financially vulnerable firms (by end-2024) in response to the COVID-19 pandemic - aggregate for available EU countries



The graph plots the share, by December 2024, of EU firms by sector that become financially vulnerable in connection to the COVID-19 pandemic and remain financially vulnerable after three years of 'normal times' activity, compared to a counterfactual in which neither the COVID-19 nor the energy cost shock materialise. Blue bars display the number of additionally vulnerable firms relative to the total number of firms; grey bars display the number of additionally vulnerable firms weighted by size (firm turnover) relative to the sectoral or economy-wide turnover. The sample covers 20 EU countries (AT, CY, DE, IE, LU, MT and NL are missing given data constraints).

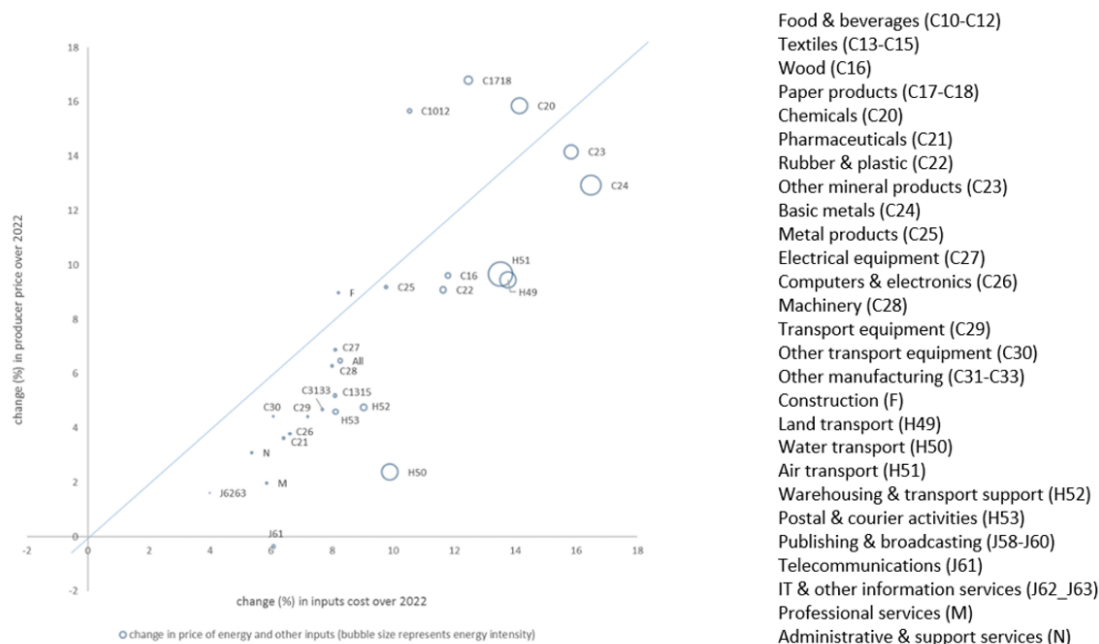
Source: Commission calculations, based on ORBIS database.

Graph III.6 plots the observed change in output prices against the computed increase in total material costs in 2022 for each industry. In energy-intensive industries both material costs and output prices have increased more strongly than in less energy-intensive industries. However, changes in output prices vary significantly even between the relatively energy-intensive industries, suggesting that the pass-through of input cost increases into output prices is heterogeneous across industries.

⁽¹⁰⁷⁾ The evidence presented in this subsection refers to industry averages, i.e. averages across all firms within an industry. Firm-level evidence for Belgium indicates that costs were the main contributing factor of increasing prices, with margins contributing negatively in 2022, and relatively more so for bigger firms. See, e.g. Bijmens G., Duprez C., and J. Jonckheere (2023): [Have greed and rapidly rising wages triggered a profit-wage-price spiral?](#) NBB Blog. Heterogeneity across firms, notably with respect to their size, may potentially be important and deserves further investigation in future analyses.

⁽¹⁰⁸⁾ Information on input deflators is not available. The increase in total material costs in each country-industry is computed by combining the available information on energy cost shocks and on output deflators from Eurostat STS with information on the shares of each country/industry in the total material cost of each country and industry, taken from input-output (IO) tables. The computed increase in material costs is given by the weighted average of price changes of energy and non-energy inputs. While being consistent with the approach used to compute the implied direct and indirect change in material costs discussed above, here there is no assumption on pass-through: the available information on output deflators is a sufficient statistic of pass-through.

Graph III.6: **Producer price change (%) versus cost change for material inputs (%) - EU average (value-added-weighted average across countries), average change Q1-2022 relative to Q4-2021**



The x-axis shows the cost change in per cent for the country-sector specific bundle of energy and non-energy inputs, which overall is largely driven by changes in the price of energy. The y-axis shows the producer price increase over the same timeframe. The change in material input covers direct reliance on energy, as well as indirect reliance via non-energy inputs produced with energy. Bubble sizes indicate the energy intensity (direct exposure) of the respective sector. All EU-27 countries are covered except for CY, LU, MT and SE. Sectors G, I, K and L are excluded due to data availability constraints.

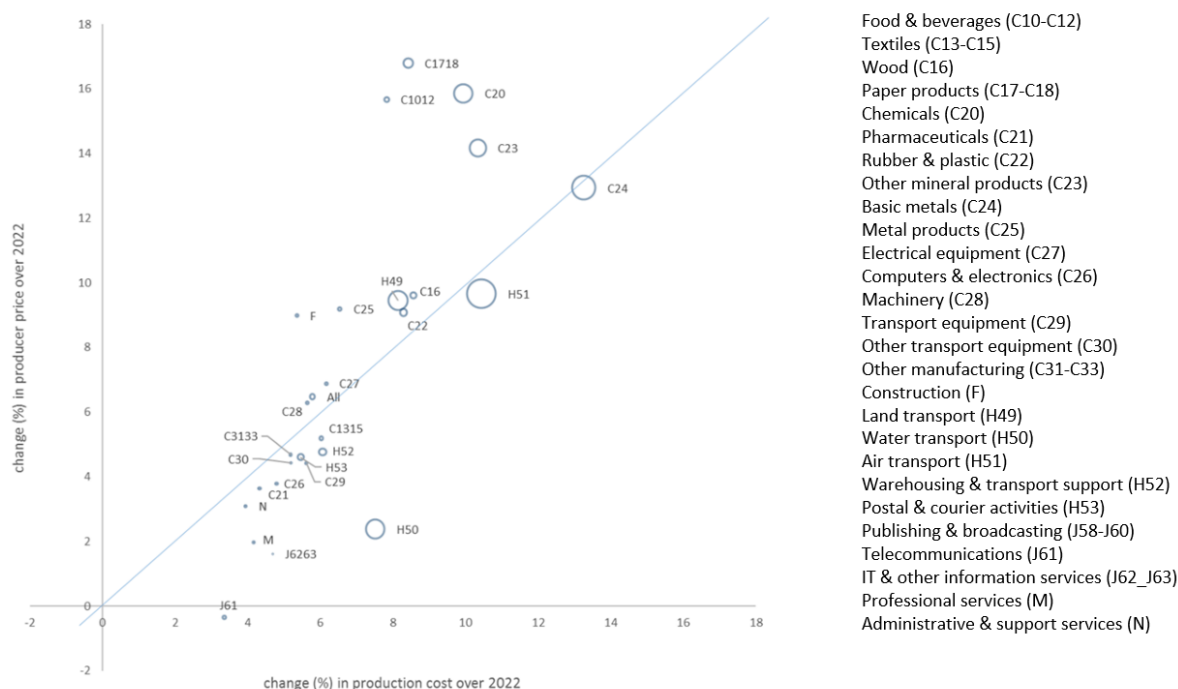
Source: Commission calculations based on OECD (2021) ICIO, Eurostat short-term business statistics, Eurostat for gas and electricity prices, European Commission's Weekly Oil Bulletin for prices of refined petroleum products.

Graph III.7 provides stylised evidence on the extent of price-cost pass-through for each industry, by plotting the observed change in output prices against the computed increase in total production costs. The total change in production costs is computed as the weighted average of changes in material costs (plotted in Graph III.6), of labour costs (taken from Eurostat STS), and of capital costs (for which prices are assumed unchanged), weighted by the cost shares of each input in total costs⁽¹⁰⁹⁾. The increase in prices and in this broader index of costs appears relatively aligned, with industries exhibiting relatively stronger price growth compared to cost growth (i.e. being located above the 45-degree line) becoming more common. Energy-intensive industries generally display stronger dynamics in both costs and prices. It is only the few industries with the highest energy intensity (transport sectors, metals) that display stronger production cost dynamics compared to output price dynamics. The difference compared to the evidence in Graph III.6 suggests relatively muted wages compared to prices, evidenced by the negative real wage growth across the EU in 2022. This evidence is broadly consistent with national account data reporting an average increases in the profit share across the euro area and the EU, as well as for broadly defined industries⁽¹¹⁰⁾.

⁽¹⁰⁹⁾ In Graph III.7, the difference between the change in final prices and in the cost index does not fully correlate with the change in profits, as residual costs (including capital, rent, and some overhead costs) are not included in the cost index. The price of this residual category is difficult to quantify at industry level. Assuming no change therefore appears to be the most transparent and prudent approach.

⁽¹¹⁰⁾ See e.g. ECB (2023): Economic Bulletin Issue 2/2023. For the U.S., see e.g. Glover A., Mistre-del-Rio J, and J. Nichols (2023): [Corporate profits contributed a lot to inflation in 2021 but little in 2022 – A pattern seen in past economic recoveries](#), FED Economic Bulletin (May).

Graph III.7: Producer price change (%) versus change in material and labour cost (%) - EU average (value-added weighted average across countries), average change Q1-2022- relative to Q4-2021



(1) The x-axis shows the cost change in per cent for the country-sector specific bundle of energy and non-energy inputs and labour. The y-axis shows the producer price increase over the same timeframe. The change in material input costs covers direct reliance on energy, as well as indirect reliance via non-energy inputs produced with energy. Bubble sizes indicate the energy intensity (direct exposure) of the respective sector. All EU-27 countries are covered except for CY, LU, MT and SE. Sectors G, I, K and L are excluded due to data availability constraints. Observations below (above) the 45-degree line would be suggestive of imperfect (excessive) pass-through, unless they are the result of residual cost changes (including capital) over the same timeframe.

Source: Commission calculations based on OECD (2021) ICIO, Eurostat short-term business statistics, Eurostat for gas and electricity prices, European Commission's Weekly Oil Bulletin for refined petroleum products.

Overall, the evidence suggests that after the energy crisis firms were generally able to absorb the rise in energy costs through higher output prices. In turn, higher output prices protected profit margins, but apart from in a few sectors, did not increase them. However, this evidence is suggestive only, as the fact that cost increases are matched by increases in final prices is not a sufficient indication that the increase in prices is a response to the cost shock to output prices (causality). Moreover, a full-fledged analysis of the extent of pass through of energy cost shocks to output prices needs to take the different margins of adjustment available to firms into account, which, in addition to output prices, include energy demand, output volumes and production techniques⁽¹¹⁾. With those caveats in mind, the evidence nonetheless suggests that pass-through has taken place.

This contrasts with the assumption underlying the micro-simulations reported in this article, which represent a worst-case scenario. The extent of pass-through of energy prices to output prices may vary considerably across sectors. The above evidence suggests that energy intensity may play a role. Moreover, recent evidence on price-cost margins may not be representative of future dynamics. Price and cost growth appear to be decelerating after a strong pick-up in 2021. Price increases were generally steeper than cost increases in 2021, but since 2022 both price and cost growth have been decelerating. This is especially the case for prices in most sectors. The narrowing of price cost margins reflects, on the one hand, the

⁽¹¹⁾ Preliminary evidence from an attempt to structurally estimate pass-through from energy costs to prices, taking into account the various margins of adjustment, based on historical (pre-2021) data from French firms finds pass-through from energy costs to output prices to be nearly complete, on average. See Fontagné, L., Ph. Martin, and G. Orefice (2023): [The many channels of firm's adjustment to energy shocks: evidence from France](#), CEPR Discussion Paper 18262.

easing of temporary demand overhang in the post-COVID recovery, underpinning output price growth, and, on the other hand, persistent growth in production costs linked notably to the lagged reaction of wages to the inflation environment ⁽¹¹²⁾.

III.5. Policy considerations and concluding remarks

The energy crisis linked to the war of aggression against Ukraine triggered prompt action at EU level, and received attention by the Eurogroup.

In the emergency phase, the EU has mobilised funds and introduced regulatory measures to address the implications of Russia's war of aggression against Ukraine on the energy system (REPowerEU) ⁽¹¹³⁾. It has also given guidance to Member States on national support to address the energy crisis, recommending that the support be temporary, targeted and compatible with incentives to save energy ⁽¹¹⁴⁾. The Eurogroup issued a statement in October 2022, reaching similar conclusions on support measures.

Since the start of the war, support to corporations has been guided by the EU Temporary Crisis Framework (TCF) for State aid (see Box 2). The amount of State aid approved under the TCF during the first 11 months of the war has been substantial (Graph III.8), notably provided in the form of credit guarantees and subsidised loans.

More recently, EU initiatives focused on making sure that the energy crisis is addressed on a durable basis via structural measures (e.g. aspects of the Green Deal industrial plan ⁽¹¹⁵⁾ and the Regulation on electricity market design ⁽¹¹⁶⁾), and in its fiscal guidance for 2024, the Commission recommended phasing out the existing support in line with the relevant plans.

Since the onset of the energy crisis, EU Member States have taken a variety of measures to mitigate the impact of higher energy prices. In line with EU and euro area guidance, most of those measures were intended as temporary. However, only a minority of measures aimed at reducing the actual cost of energy ('price measures') were targeted to households ⁽¹¹⁷⁾.

Challenges to addressing corporate distress due to the energy crisis have an EU and euro area dimension and require a coordinated response. Appropriate policy responses were discussed by the Eurogroup on 15 May 2023 ⁽¹¹⁸⁾. The main goal for policy is to ensure that structural measures to foster the energy transition, enhance energy efficiency, and reduce energy dependency are taken in an effective and timely fashion. Challenges ahead also relate to the need to ensure that the support is phased out in line with the Eurogroup's 13 March statement. The support should also be increasingly targeted, compatible with

⁽¹¹²⁾ See, e.g. Arce, O., E. Hahn, and G. Koester (2023): [How tit-for-tat inflation can make everyone poorer](#). The ECB Blog, 30 March 2023. The European Commission Spring Forecast 2023 projects an increase in real unit labour costs in the euro area and the wider EU starting in 2024, which is indicative of productivity-adjusted wages increasing more than prices, implying a reduction in the profit share if not accompanied by a reduction in other production costs.

⁽¹¹³⁾ European Commission (2022): [Communication from the Commission to the European Parliament, the European Council, the Council, the Economic and Social Committee, and the Committee of the Regions: REPowerEU Plan](#), 18/05/2022, COM(2022) 230 final.

⁽¹¹⁴⁾ Guidance on Member State support to cushion the energy crisis was provided already in the October 2021 Communication (toolbox). The country-specific recommendations issued in May 2022 specified that budgetary objectives would also consider the need to mitigate the impact of high energy prices on vulnerable households and firms, and promoted a temporary approach to support, targeted at vulnerable households and firms, while maintaining incentives to save energy. The 2023 Council Recommendation on the economic policy of the euro area recommends targeting fiscal support to address the impact of high energy prices on vulnerable households and companies, and in particular replace broad-based price support measures by a cost-efficient two-tier energy pricing that ensures incentives for energy savings.

⁽¹¹⁵⁾ European Commission (2023): [Communication from the Commission to the European Parliament, the European Council, the Council, the Economic and Social Committee, and the Committee of the Regions: A Green Deal Industrial Plan for the Net-Zero Age](#), COM(2023) 62 final.

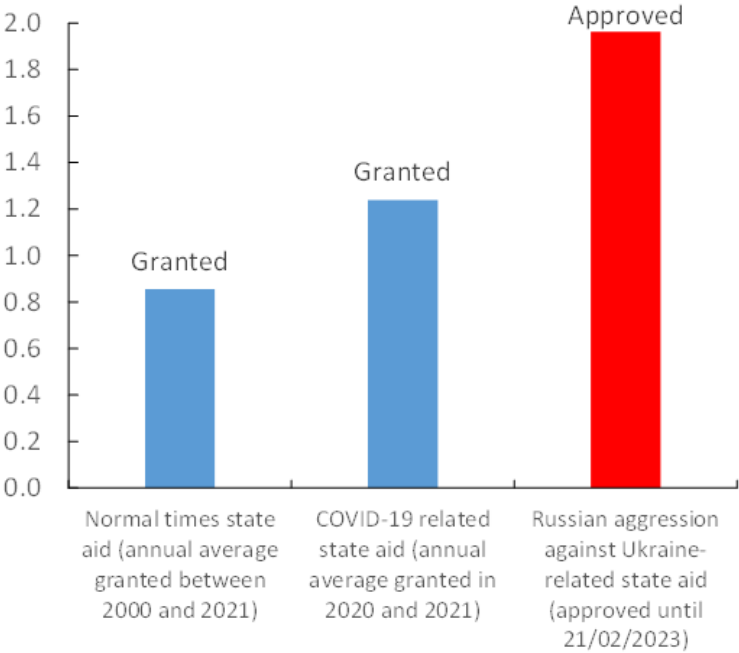
⁽¹¹⁶⁾ European Commission (2023): [Proposal for a Regulation of the European Parliament and of the Council amending Regulations \(EU\) 2019/943 and \(EU\) 2019/942 as well as Directives \(EU\) 2018/2001 and \(EU\) 2019/944 to improve the Union's electricity market design](#), 14/03/2023, COM(2023) 148 final, 2023/0077 (COD).

⁽¹¹⁷⁾ European Commission (2022): Measures to mitigate the impact of the high energy prices on households and firms and their fiscal costs: Note to the Economic and Financial Committee, 06/05/2022; European Commission (2022): Fiscal measures to counter high energy prices: Note to the Eurogroup Working group, 24/06/2022.

⁽¹¹⁸⁾ The discussion took place on the basis of a technical note by the Commission: 'Corporate vulnerability and the energy crisis: challenges and policy responses', <https://www.consilium.europa.eu/media/64262/e.g.-note-corporate-vulnerability.pdf>.

preserving the single market, with incentives to save energy and, where possible, with promoting the move towards cleaner forms of energy ⁽¹¹⁹⁾. Support should be designed in ways that prevent an excessive growth in corporate debt, and insolvency frameworks may need to be adapted to alleviate debt distress. Measures to address corporate distress may need to be accompanied by flanking measures to address employment and social implications. The challenges have implications for economic activity and inflation developments. Addressing them in a coordinated way, notably with commonly agreed criteria, may contribute to developing an appropriate macroeconomic policy mix.

Graph III.8: **State aid, EU-27, various periods**



Source Data on granted State aid come from the European Commission State Aid scoreboard (covering 1 January – 31 December 2020). The data are based on annual State aid expenditure reporting by Member States in line with Article 6(1) of Commission Regulation (EC) 794/2004. Data on the approved State aid after the Russian aggression against Ukraine (TCF context) are available in the State aid registry (https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=1,2,3)

⁽¹¹⁹⁾ See European Commission, ‘Corporate vulnerability and the energy crisis: challenges and policy responses’, Commission, <https://www.consilium.europa.eu/media/64262/e.g.-note-corporate-vulnerability.pdf>

Box III.1: The EU Temporary Crisis Framework (TCF) for state aid

Support to corporations has been guided by the provisions of the EU Temporary Crisis Framework (TCF) for State aid. The TCF, adopted on 23 March 2022 and amended on 20 July 2022, 28 October 2022 and 9 March 2023, sets out the criteria for assessing the compatibility of State aid with the single market. In doing so, it takes account of the impact of Russia's war of aggression against Ukraine.

According to the TCF, up to 31 December 2023, subject to certain conditions, Member States are allowed to:

- (i) grant limited amounts of aid to companies;
- (ii) ensure sufficient liquidity;
- (iii) compensate for exceptionally high gas and electricity prices;
- (iv) accelerate the roll-out of renewable energy, storage and renewable heat relevant for REPowerEU;
- (v) decarbonise industrial production processes; and
- (vi) incentivise additional reductions of electricity consumption.

The criteria for granting aid to compensate for high gas and electricity prices is based on a two-tier approach:

- the eligible costs that can be compensated through State aid cannot exceed 50% of the increase in the price of energy compared with the average price in 2021, and
- it cannot cover more than 70% of the energy consumption recorded in 2021.

The TCF further specifies the upper limits for the total amount of admissible aid. These limits depend on earning losses incurred by the firm compared to 2021, the energy intensity of the firm, and whether it operates in sectors with a high risk of losses in competitiveness ⁽¹⁾.

⁽¹⁾ On 9 March 2023, amendments were made to the TCF to: (a) prolong to 31 December 2023 the possibility to introduce measures under points (iv) and (v) above and ease conditions; and (b) introduce new measures, applicable until 31 December 2025, notably to further accelerate investments in key sectors to support the transition towards a net-zero economy.

Annex. The euro area chronicle

The Commission, the Economic and Financial Affairs Council and the Eurogroup regularly take decisions that affect how the Economic and Monetary Union works. To keep track of the most relevant decisions, the QREA documents major legal and institutional developments, presented in chronological order with references. This issue covers developments between mid-March and end-June 2023.

Reform of bank crisis management and deposit insurance framework. On 18 April 2023, the European Commission adopted proposals to adjust and further strengthen the existing EU bank crisis management and deposit insurance (CMDI) framework.⁽¹²⁰⁾ The proposals will enable authorities to organise an orderly market exit for failing banks of any size and business model, including smaller players. Overall, the proposal is designed to preserve financial stability, protect taxpayers and depositors, and increase the efficiency of the crisis management framework for the economy.

New economic governance rules fit for the future. On 26 April 2023, the Commission presented legislative proposals to implement a comprehensive reform of the EU's economic governance rules.⁽¹²¹⁾ The central objective of these proposals is to strengthen public debt sustainability while promoting sustainable and inclusive growth in all Member States through reforms and investment. In particular, the Member States' fiscal strategy would be based on a medium-term net expenditure path anchored on debt sustainability. The proposals take into account the need to reduce the high public debt levels, build on the lessons learned from the EU policy response to the COVID-19 crisis, and prepare the EU for future challenges by supporting progress towards a green, digital, inclusive and resilient economy and making the EU more competitive.

Economic and fiscal policy guidance. On 24 May, the Commission adopted the European Semester package providing guidance to Member States to build a robust and future-proof economy that secures competitiveness and long-term prosperity for all in the face of a challenging geopolitical environment. This year, the country-specific recommendations include: i) a fiscal policy recommendation, including, where relevant, fiscal-structural reforms; ii) a recommendation to continue or accelerate the implementation of RRFs, including their revisions and the integration of REPowerEU chapters, and to swiftly implement the adopted cohesion policy programmes; iii) an updated and more specific recommendation on energy policy in line with the REPowerEU objectives; and iv) where relevant an additional recommendation on outstanding and/or newly emerging structural challenges. As regards fiscal policy, the Commission provided quantified and differentiated recommendations for 2024 as the period of activation of the general escape clause ends at end-2023.⁽¹²²⁾ These recommendations establish the maximum growth rates for net primary expenditure. The Commission also called on Member States, to i) preserve nationally financed public investment and ensure the effective absorption of grants under the RRF and other EU funds; and ii) wind down the energy support measures in force by the end of 2023 unless renewed energy price increases require support measures. For the period beyond 2024, Member States should continue to pursue a medium-term fiscal strategy of gradual and sustainable consolidation, which, combined with investments and reforms conducive to higher sustainable growth, allows to achieve a prudent medium-term fiscal position. In the context of the same package, the Commission also assessed the existence of macroeconomic imbalances for 13 euro-area Member States.⁽¹²³⁾ The Commission concluded that, after experiencing excessive imbalances until 2022, Cyprus is now experiencing imbalances, as vulnerabilities related to private, government and external debt remain a concern even if overall they have declined. Germany, Spain, France, Portugal, and the Netherlands, continue to experience imbalances. Vulnerabilities are receding in Germany, Spain, France, and Portugal to the extent that a continuation of these trends next year would provide ground for a decision of no imbalances. Greece and Italy continue to experience excessive imbalances, but their vulnerabilities appear to be receding also due to policy progress. Estonia, Latvia, Lithuania, Luxembourg, and Slovakia are not found to be experiencing

⁽¹²⁰⁾ https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2250

⁽¹²¹⁾ https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/economic-governance-review_en

⁽¹²²⁾ https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2872

⁽¹²³⁾ https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/macroeconomic-imbalance-procedure/depth-reviews_en

imbalances as their vulnerabilities seem overall to be contained at present. Finally, the latest post-programme surveillance reports for Ireland, Greece, Spain, Cyprus and Portugal, conclude that all five Member States retain the capacity to repay their debt. ⁽¹²⁴⁾

After Estonia, five other euro area Member States submitted the REPowerEU chapters to add to their RRP. Following Estonia (on 9 March ⁽¹²⁵⁾), France submitted its REPowerEU chapter on 20 April, covering measures related to energy efficiency in buildings, the net-zero industry and non-fossil hydrogen. ⁽¹²⁶⁾ On 26 April, Slovakia and Malta submitted a similar request. ⁽¹²⁷⁾ Slovakia's updated plan includes in particular reforms in support of renewable energy sources, including geothermal energy and the hydrogen sector, transformative investments in the electricity grid and energy efficiency, as well as in support for transport sector and households at risk of energy poverty. For Malta, the REPowerEU chapter includes a reform aiming at accelerating the permitting of renewable energy projects and introducing an obligation to install rooftop solar panels on new buildings, and an investment targeted at upgrading and expanding the electricity grid's capacity. On 26 May, Portugal submitted its REPowerEU chapter, with reforms and investments focusing on energy efficiency in buildings, renewables and biogas, sustainable transport, the electricity grid and green industry. ⁽¹²⁸⁾ A transformative REPowerEU chapter was also submitted by Spain on 6 June, covering both reforms and investments, aimed at further weaning the country off Russian fossil fuels. ⁽¹²⁹⁾

Disbursements under the Recovery and Resilience Facility to Slovakia and Luxembourg. On 22 March, €709 million of grants under the RRF were disbursed to Slovakia, following a positive preliminary assessment adopted by the Commission on 8 February. ⁽¹³⁰⁾ This pertains to a payment request submitted by Slovakia on 25 October 2022 concerning the second instalment. It covers reforms and investments regarding the circular economy, in the education and healthcare systems, in the governance of Research & Innovation activities, in schemes to attract skilled workers, as well as in the digital economy, public procurement and the fight against corruption. This second payment request also covers investments aimed at the protection of nature and biodiversity and at improving digital skills. On 16 June, €20.2 million of grants under the RRF were disbursed to Luxembourg, after a positive preliminary assessment adopted by the Commission on 28 April. ⁽¹³¹⁾ This concerns a payment request submitted by Luxembourg on 28 December 2022 regarding the first instalment. It includes a reform aimed at increasing the supply of affordable rental housing, the digitalisation of the public sector and green mobility measures. The milestones and targets also confirm progress towards the completion of investment projects related to ultra-secure communication, the upskilling of the workforce and the digitalisation of health. By the end of June, about €99 billion of grants and €44 billion in loans were disbursed under the RRF to euro area Member States. ⁽¹³²⁾

The Commission adopted legislative proposals to support the use of cash and to propose a framework for a digital euro. On 28 June, the Commission put forward a legislative proposal on the legal tender of euro cash to safeguard the role of cash, to ensure it is widely accepted as a means of payment and remains easily accessible for people and businesses across the euro area. ⁽¹³³⁾ In addition, the Commission proposed the legal framework for a possible digital euro as a complement to euro banknotes and coins. The digital euro would ensure that people and businesses have an additional choice – on top of current private options – that allows them to pay digitally with a widely accepted, cheap, secure and

⁽¹²⁴⁾ https://commission.europa.eu/publications/2023-european-semester-spring-package_en

⁽¹²⁵⁾ https://ec.europa.eu/commission/presscorner/detail/de/mex_23_1590

⁽¹²⁶⁾ https://ec.europa.eu/commission/presscorner/detail/en/mex_23_2406

⁽¹²⁷⁾ https://ec.europa.eu/commission/presscorner/detail/en/mex_23_2483

⁽¹²⁸⁾ https://ec.europa.eu/commission/presscorner/detail/en/mex_23_2945

⁽¹²⁹⁾ https://ec.europa.eu/commission/presscorner/detail/es/mex_23_3123

⁽¹³⁰⁾ https://ec.europa.eu/commission/presscorner/detail/en/mex_23_1821

⁽¹³¹⁾ https://ec.europa.eu/commission/presscorner/detail/en/mex_23_3322

⁽¹³²⁾ Including prefinancing.

⁽¹³³⁾ https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3501

resilient form of public money in the euro area, complementing the private solutions that exist today. This proposal establishes the r the digital euro and regulates its essential aspects, including establishment and issuance, legal tender, financial stability, privacy, international use, distribution and compensation. However, it will ultimately be for the European Central Bank to decide if and when to issue the digital euro.