PSL Quarterly Review

vol. 76 n. 306 (September 2023)

Special issue on the economic consequences of the war

Profit-led or cost-led inflation? Propagation effects through the EU inter-industry network

GIACOMO CUCIGNATTO, NADIA GARBELLINI and FACUND FORA-ALCALDE

Abstract:

The return of persistent inflation in OECD countries has been the most significant macroeconomic phenomenon in recent years. This article analyses different explanations for the current inflationary dynamics, from which various policy recommendations arise. Specifically, by using a Multi-Regional Input-Output (MRIO) model, the article investigates whether the rise in profits and profit share is the result of changes in the behaviour of firms or just the natural outcome of rising energy costs, in the case of France, Italy and Spain. Our results indicate that companies raised prices more than necessary in order to maintain their levels of profitability in each of the European economies analysed, confirming that inflation hikes were led by surging profits. This implies that the introduction or strengthening of price controls would help to rapidly bring inflation under control, protecting the purchasing power of households.

Cucignatto: Sapienza University of Rome,
email: giacomo.cucignatto@uniroma1.it
Garbellini: University of Modena and Reggio Emilia,
email: nadia.garbellini@unimore.it
Fora-Alcalde: Autonomous University of Barcelona and University of the Balearic Islands,
email: facund.fora@uab.cat

How to cite this article:
Cucignatto G., Garbellini N., Fora-Alcalde F. (2023), "Profit-led or cost-led inflation? Propagation effects through the EU inter-industry network", *PSL Quarterly Review*, 76 (306):261-276.

DOI: https://doi.org/10.13133/2037-3643/18215

JEL codes:
E31, J30, C67, E64

Keywords:
inflation, input-output, profit-price spiral, price controls

Journal homepage:
http: //www.pslquarterlyreview.info

After several decades characterised by price stability, developed economies have been suffering from surging price hikes since mid 2021. While the average inflation rate in the Eurozone had been 1.7% between 2000 and 2019, peaking at 4% in 2008, this index increased to 5.8% between the beginning of 2021 and May 2023, with peaks above 10% for a few months in 2022 (Eurostat, 2023b). In the United States, this rate reached a 40 years record high in 2022 (Bureau of Labour Statistics, 2023) and the same happened in the United Kingdom (Office for National Statistics, 2023).[1]

In OECD countries, tthe return of persistent inflation has led to a reduction in real wages, with a year-on-year average change of –3,8% in the first quarter of 2023. Real wages declined for several quarters in most countries, falling below the level of the fourth quarter of 2019 in the last quarter of 2022 (Araki S. et al., 2023). In the Eurozone, (Eurostat, 2023c) data shows a

[1] Conversely, it is interesting to note that the average inflation rate in the People's Republic of China (PRC) stood at a modest 1.33% over the same period (OECD, 2023).

4,3% loss in the purchasing power of wage earners, as an average across countries and wage levels, between 2021 and 2022. However, the European Central Bank (2023) calculates that people in the lowest income quintile have lost three times the purchasing power lost by the upper quintile, and ten times that lost by the top 5% of the income earners (see also Lampa and Oro, 2023). This implies that millions of people have seen how their buying capacity was reduced by 8, 10 or 12%, depending on the country.

The standard explanation proposed by neoclassical economists is that rising prices are the consequence of central banks' oversupply of money during the world pandemic (Bohanon and Horowitz, 2022; Summers, 2021, 2022). According to them, this higher supply of money led to a higher purchasing power of people and firms, not backed by an increase in the productive capacity of the economy. Faced with more demand than that which they could supply, firms have raised their prices. However, this explanation falls short in several ways. The quantity theory of money has been increasingly discredited by economic research and many contributions show that an exogenous increase in the monetary base does not produce any positive effect on prices (Carnevali and Deleidi, 2023; Vague, 2016).

The only policy recommendation that follows from the mainstream understandings of the inflationary process, then, is to raise interest rates to avoid changes in expectations about future price hikes. In this view, taxation of profits – such as the recently discussed Excess Profits Tax (Christians and Magalhaes, 2020; Hebous et al., 2022) and Price Controls (Galbraith, 1980, 2022; Weber, 2021) would make the situation worse by stimulating the appearance of black markets and reducing the already limited supply, in a self-reinforcing destructive loop. Moreover, wage increases could aggravate the situation by making it more difficult for firms to meet ends and keep producing, and/or by triggering wage-price spirals (Henderson, 2023; Niles, 2023).

A second explanation asserts that prices have increased in western economies due to rising costs in the acquisition of inputs – mainly natural gas – after the pandemic and the conflict in Ukraine (Colonna et al., 2023; Vernengo and Perez, 2023). Since mark-ups are calculated as a percentage to be levied on costs, higher costs imply higher profits and profit share. This is the case for most developed economies in the current inflationary period, as recognised by leading economic institutions (Arce et al., 2023; International Monetary Fund, 2023).

However, as Lavoie (2023) rightly put it, theoretically "a rise in profits and the profit share can be explained without resorting to an explanation based on firms taking advantage of the situation and raising markup rates".[2] Moreover, he argues that markup rates didn't increase also in practice, denying the existence of generalised "profit inflation" or "seller's inflation" – a view which held by a third line of research (Storm, 2023; Weber and Wasner, 2023) – which confirms the surge in markups and their impact on inflation.

While the division on the determinants of the current inflationary dynamics may seem minimal, the policy implications are relevant. If the second explanation is correct, there would not be much to do to prevent current inflation. Vernengo and Perez (2023) consider it unlikely

[2] Lavoie's arguments are twofold. The first is that when production falls as it did during the pandemic, fixed costs remain unchanged, and thus their ratio to profits rises. With recovery, profits rise again and thus the weight of fixed costs falls. This is therefore not an increase in mark-ups, but a return to their pre-pandemic level. The second can be illustrated by the example of semiconductors, the demand for which rapidly increased during pandemic well beyond production, leading to a rise in prices. In this case, Lavoie argues, a company using the semiconductor as an input will increase its price even with an unchanged mark-up. What Lavoie fails to grasp is that in this case there was a mark-up increase by the semiconductor-producing industry, not by the semiconductor-using one.

that price controls will work in the short term, being "sceptical about the political feasibility of their introduction in the U.S. in time to have a relevant effect on the current inflationary period".[3]

The second explanation, which asserts that inflation is only a consequence of rising costs, is the focus of this paper. As discussed above, although the increase in profit shares is now acknowledged by virtually all economists, it is being discussed whether or not this rise in profits is a consequence of changes in firms' behaviour – i.e., rising markups – or the natural outcome of rising costs and the need to ensure a certain markup in order to guarantee the continuation of productive activity. Therefore, it is unclear whether companies' pricing strategies are to be blamed for the current inflationary process and, thus, price controls would have been effective to control price hikes (Colonna et al., 2023; International Monetary Fund, 2023).

We aim to contribute to this discussion by asking two questions. Firstly, what would be the impact of a 500% increase in the price of gas purchased by EU countries leaving value added per unit of output unchanged? In other words: what would be the price dynamic due exclusively to the increase in energy prices? The answer allows us to verify whether inflation is indeed only due to the increase in production costs which are linked to the increase in gas prices. Second, what would happen to gross operating margin by industry if this increase in unit costs resulted in a corresponding decrease in unit profits, leaving prices unchanged? In other words, would controlling prices jeopardise the viability of the industrial system? On this regard, we provide an estimate of the price control necessary to contain only the increase in gas prices, i.e., without considering the increase in markups, the containment of which would have a greater impact on the gross operating margin.

We discussed the case of Italy in a previous essay (Cucignatto and Garbellini, 2022). Now, we aim to compare those results with France and Spain, as they each followed one of the two main policy options related to inflation control that we are interested in: implementing price controls from the start or implementing them later – unlike Italy, which did not implement price controls at any point.

In section two, we present the methodology and the data used in our calculations. The third section presents our findings and explores the economic and political factors influencing them. In the fourth and final section, we present some concluding remarks and the policy implications that follow.

2. Methodology

The empirical exercise carried out in the present paper begins with a Multi-Regional Input-Output (MRIO) framework (using OECD ICIO data), as it focuses specifically on France, Italy and Spain. Consider the case with $n(i = 1, \dots, n)$ industries and M $(J = A, \dots, M)$ countries.

[3] Vernengo and Perez (2023) are aware of the distributional consequences of inflation, advocating for, albeit vaguely, the need for an income policy to support real wages, especially at the bottom of the income distribution. Surprisingly, to the best of our knowledge Lavoie (2023) did not take a clear position on the policies needed to contain inflation and protect the real wages of the working class.

As is well known, the value at current prices of output, q, can be written either as the sum of intermediate, X, and final deliveries, d, or as intermediate purchases, X, plus value added, u:[4]

$$q_{(M\cdot n\times 1)} \equiv X_{(M\cdot n\times M\cdot n)} \cdot e_{(M\cdot n\times 1)} + d_{(M\cdot n\times 1)} \quad (1)$$

$$q^T{}_{(1\times M\cdot n)} \equiv e^T{}_{(1\times M\cdot n)} \cdot X_{(M\cdot n\times M\cdot n)} + u^T{}_{(1\times M\cdot n)} \quad (2)$$

Whereas expression (1) – the quantity system – can be used to measure the impact on output of exogenous final demand shocks, we can use expression (2) – the price system – to measure the impact on prices of a change in value added items.

More specifically, starting from the price system (2) we can write:

$q^T\hat{q}^{-1} = e^T X\hat{q}^{-1} + u^T\hat{q}^{-1}$

from which we get:

$e^T = e^T A + v^T$

And hence:

$e^T = v^T(I - A)^{-1}$

what we get is a price index vector for the base year – 2018 in our case – if unit value added changes by Δv^T, prices will change above/below 1, the percentage change being given by:

$\Delta v^T(I - A)^{-1} - e^T$

The aim of this paper, however, is to estimate the network effect on prices of a change in the price of natural gas. In order to do so, we block partitioned the relevant matrices and vectors as follows:

$$X = \begin{bmatrix} X_{NN} & X_{NE} \\ X_{EN} & X_{EE} \end{bmatrix}$$

$$q = \begin{bmatrix} q_N \\ q_E \end{bmatrix}$$

$$v^T = [v_N^T \quad v_E^T]$$

where E stands for energy and N for non-energy activities. By energy we mean activity 05T06 – mining and quarrying, energy producing products (fossil fuels) – as per the ICIO database.

From expression (2), we get:

$q_N^T = e_N^T \cdot X_{NN} + e_E^T \cdot X_{EN} + v_N^T \cdot \hat{q}_N$

If we consider fossil fuels as imported input, we can write:[5]

$q_N^T = e_N^T \cdot A_{NN} \cdot \hat{q}_N + \varepsilon_N^T \cdot \hat{q}_N + v_N^T \cdot \hat{q}_N$

and hence:

[4]In what follows, upper case letters will denote matrices and lower case letters vectors. The latter have to be intended as column vectors, unless explicitly transposed. Unit (or sum) vector is denoted by e. X is the matrix of inter-industry transactions, whereas $A = X\hat{q}^{-1}$ is the matrix of input-output coefficients. u^T is the (row) vector of sectoral value added, whereas $v^T = u^T\hat{q}^{-1}$ is the (row) vector of sectoral value added per unit of gross output.

[5]Where $\varepsilon_N^T = e_E^T X_{EN}\hat{q}_N^{-1}$

$$e^T = (\varepsilon^T + v^T)L \quad (3)$$

We simulate these alternative scenarios in order to answer our two research questions: 1) what would be the effect on prices of an increase in the cost of natural gas with unchanged unit value added? 2) By how much would profits[6] have to contract to keep prices constant? Would they remain positive or turn negative?

As to the second scenario – price control – we have to distinguish two cases: when the measure is implemented in a coordinated way by all EU countries; and when price controls are implemented by one single country and hence is an isolated measure.

If there is an increase in the price of gas, two things can happen in an extreme scenario: prices rise or prices do not change. The latter can happen only if wages or profits or a combination of both bear the brunt of the increase in the price of gas and are accordingly reduced, as shown in expression (3).

In the second case – isolated price controls – the situation is slightly more complicated: in order to keep prices constant, unit value added must decrease to absorb not only higher gas prices, but also higher prices of imported intermediates.

Formally, we can block-partition vectors and matrices in expression (3) in order to distinguish which country is implementing price controls (A) from the rest of EU countries (B) or the rest of the world (C):

$$[\Delta\, e_A^T \quad \Delta\, e_B^T \quad \Delta\, e_C^T] = [\Delta\, \varepsilon_A^T + \Delta\, v_A^T \quad \Delta\, \varepsilon_B^T + \Delta\, v_B^T \quad \Delta\, \varepsilon_C^T + \Delta\, v_C^T] \cdot \begin{bmatrix} L_{AA} & L_{AB} & L_{AC} \\ L_{BA} & L_{BB} & L_{BC} \\ L_{CA} & L_{CB} & L_{CC} \end{bmatrix}$$

In our scenario, energy prices change in the EU only, which means that $\Delta\, \varepsilon_C^T = 0^T$. Moreover, unit value added does not change in the rest of the EU and in the rest of the world, i.e., $\Delta\, v_B^T = \Delta\, v_C^T = 0^T$. We can therefore rewrite the expression above as:

$$[\Delta\, e_A^T \quad \Delta\, e_B^T \quad \Delta\, e_C^T] = [\Delta\, \varepsilon_A^T + \Delta\, v_A^T \quad \Delta\, \varepsilon_B^T \quad 0^T] \cdot \begin{bmatrix} L_{AA} & L_{AB} & L_{AC} \\ L_{BA} & L_{BB} & L_{BC} \\ L_{CA} & L_{CB} & L_{CC} \end{bmatrix}$$

$$= [\Delta\, \varepsilon_A^T + \Delta\, v_A^T \quad \Delta\, \varepsilon_B^T \quad 0^T] \cdot \begin{bmatrix} L_{AA} & L_{AB} & L_{AC} \\ L_{BA} & L_{BB} & L_{BC} \end{bmatrix}$$

In other words, price changes in the 3 groups of countries are given by:

$$\Delta\, e_A^T = (\Delta\, \varepsilon_A^T + \Delta\, v_A^T) \cdot L_{AA} + \Delta\, \varepsilon_B^T \cdot L_{BA}$$

$$\Delta\, e_B^T = (\Delta\, \varepsilon_A^T + \Delta\, v_A^T) \cdot L_{AB} + \Delta\, \varepsilon_B^T \cdot L_{BB}$$

$$\Delta\, e_C^T = (\Delta\, \varepsilon_A^T + \Delta\, v_A^T) \cdot L_{AC} + \Delta\, \varepsilon_B^T \cdot L_{BC}$$

For prices not to change in the countries implementing controls, we must have $\Delta\, e_A^T = 0^T$:

$$(\Delta\, \varepsilon_A^T + \Delta\, v_A^T) \cdot L_{AA} + \Delta\, \varepsilon_B^T \cdot L_{BA} = 0^T$$

i.e.:

[6] The concept of 'profit' adopted here is that of gross operating margin, which can be derived from OECD data.

$$\Delta v_A^T = -(\Delta \varepsilon_A^T + \Delta \varepsilon_B^T \cdot L_{BA} \cdot {L_{AA}}^{-1})$$

Turning to the scenario definition, we considered a 500% increase in the price paid by EU countries for natural gas, independent of its geographical origin. This figure is the percentage difference between Title Transfer Facility (TTF) price on December 31st, 2018, and the average price in 2022. We are aware that this means over-estimating the producer price increase, for a variety of reasons. However, since our contention is that prices have been growing more than production costs – and this is actually our conclusion after performing the empirical exercise – such over-estimation is in fact reinforcing our results.[7]

3. Results and discussion

In France (figure 1), we observe that 38 out of 44 economic sectors would have experienced price increases of less than 2.5%, if not less than 1%, had unit value added remained constant. Of course, some branches show a double-digit price increase, and in some others the price might increase between 2.5 and 10%: paper products, +2.5%; mining-non energy products, +3.5%; other non-metallic mineral products, +3%; chemicals, +6%; petroleum refining, +10%; basic Metals, +13% and electricity & gas Supply, skyrocketing to +40%.

There are two particularly relevant facts behind the results obtained for France. The first is that the low weight of gas in its energy mix – especially compared to the other major European economies studied in this paper – does not suffice to contain the impact of an increase in the price of this natural resource and show a lower increase in prices relative to its European neighbours in our simulation.

This could be caused by two facts: a high energy intensity[8] and a high share on total intermediate commodities, of inputs imported from countries with an important weight of gas in their energy mixes, and/or a large energy intensity.

On the other hand, it is interesting to point out the difference between the rise in costs – which, according to our simulation, was higher in France than in the other economies – and the actual rise in prices – which, according to the main statistical bureaus, was lower in France than in the other economies. Different elements may explain this but, as we will see in the following section, policy-related issues likely had an important role.

Within our sample, Italy experienced the highest rise in gas prices, with a few sectors being well above the double-digit threshold: electricity & gas supply (+37%), basic metals (+21%) and chemicals (+12%). Furthermore, 12 sectors out of 44 show price growth between 10% and 4%, including logistic sector (10%), petroleum refining (+8%), postal services (+8%), mining-non energy products (+6%) and so on. Only four branches were expected to undergo a price rise less than 2%.

In the Spanish economy 36 out of 44 sectors show a price change within a threshold of 2.5%, with the higher increases in prices being over 10%: electricity & gas supply (+22.5%), petroleum refining (+13%) and basic metals (+10%). There are, of course, sector-specific

[7] Industry 05T06 does include not only natural gas, but also petroleum, coal and lignite. We therefore used an external data source – Exiobase dataset – to separate the three sources and turn vector ε_N^T into a three-row matrix, and then apply the 500% increase to the gas purchases only. This also entails a certain degree of approximation, since Exiobase data are characterised by a different disaggregation – with a direct correspondence to ISIC Rev. 2.
[8] The energy intensity is a ratio between the amount of energy used and the GDP produced in a given economy.

characteristics influenced by unique national attributes. In the case of Spain, energy producing sectors might be affected by the Iberian peninsula's unique infrastructural position in the European energy system, a gas island with limited pipeline connection to northern Europe as well as much of Europe's LNG import capacity.

Considering our three economies, the *Harmonized Index of Consumer Prices* (HICP) grew cumulatively by 11.9% in France, 12.3% in Italy and 13.5% in Spain during the period under scrutiny (2018-2022).[9] If we use the vector of private consumption from OECD ICIO tables as weights, our estimates of sectoral price changes – the first part of the empirical exercise conducted above – implies a change in consumer prices by 2.41% in France, 3.53% in Italy, and 1.74% in Spain.

Clearly, increases in production costs in different sectors related to higher gas prices are not the sole explanation for the persistent high inflation rates recorded in the EU since the second half of 2021 and especially in 2022. In other words, the average economy-wide rise in prices provoked by the gas hike is not enough to justify the overall price dynamic.

We are missing something. This gap between the actual inflation rate and the impact of the increase in gas price hides a distributional conflict. National income is divided between wages and profits (plus after-tax subsidies[10]). If imported energy prices are not the only responsible for the inflation dynamic, the combination of stagnant nominal wages and rising prices can only mean that profits are growing, further shifting the income distribution in favour of capital.

It is therefore legitimate to conclude that we are observing a profit-led inflation – a profit mark-up-price spiral, as suggested by Storm (2023). In this situation, the argument brought by the advocates of wage moderation is somehow paradoxical (see as an example the recent statements of Bank of Italy Governor Ignazio Visco, 2023): if nominal wages automatically adjust to inflation – that is, the value of real wages is fixed – price of gas increases automatically translate into increases in all prices, which will then require a further increase in nominal wages, which will cause a further increase in prices, and so on, in a wage-price spiral. This is exactly the opposite of what is happening.

There are two cases in which rising gas prices increase the burden of energy on production costs: if the value added remains the same, prices will rise – the case we considered so far. Otherwise, we can keep prices constant, letting the value added absorb the shock. Specifically, if we reverse the above argument, keeping prices constant by compressing profits rather than wages would not only be possible, but also necessary, especially looking at the data on the wage share in Italy since 1960 (figure 2).

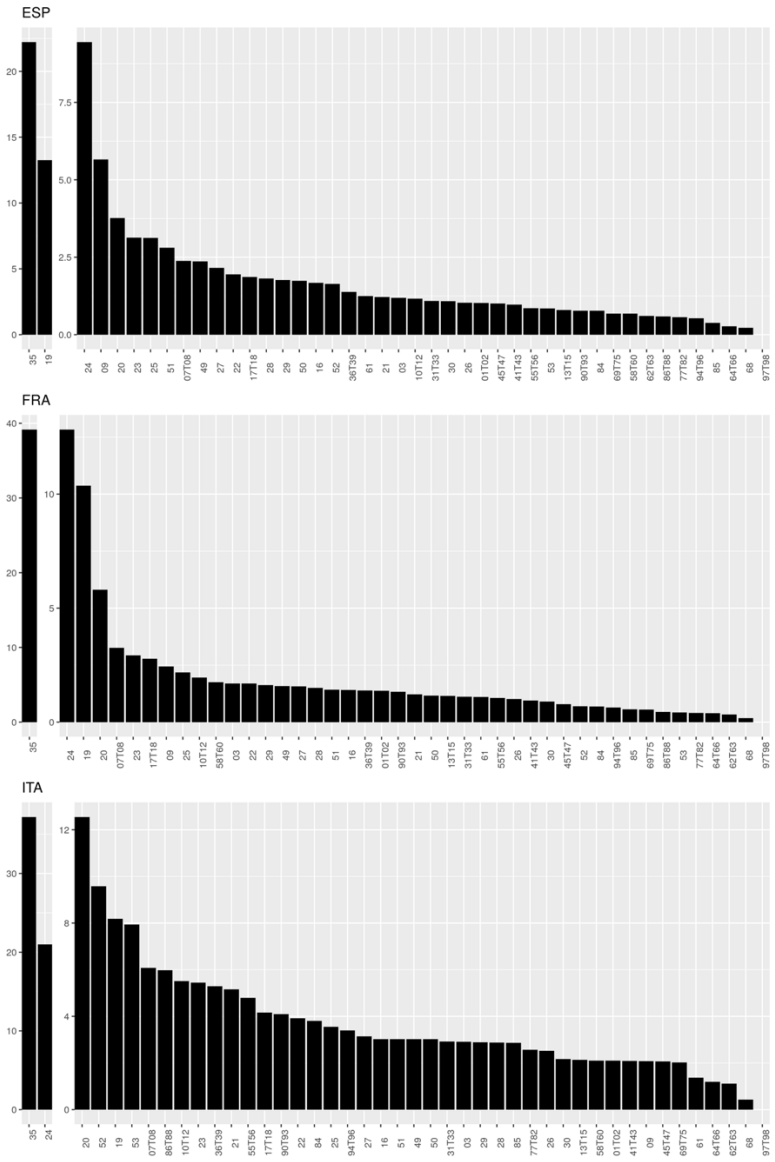
Returning to our scenario, we can now pose a mirrored question to the one we asked at the beginning of this section, namely: in the face of an increase in the price of natural gas, by how much would profits have to shrink in each sector of each country to keep its prices constant? The answer depends on whether the price cap is applied only in the country taken into consideration (the isolated scenario) or, instead, if it is applied in all European countries at a time (the coordinated scenario), thus limiting the increase in the import prices of each sector and country analysed.

Focusing on France (table 2), electricity & gas supply is again the sector most exposed to the reduction in gross operating margins – losing almost 25 p.p. from a 19.8% GOM-to-GO (Gross Output) ratio before the shock in both scenarios. A similar phenomenon is observed in

[9] HICP – annual data (average index and rate of change). Online data code: PRC_HICP_AIND. Source: Eurostat.
[10] Which are very small and not relevant for our purpose. We can put them aside in our analysis.

basic metals, from 7.4% GOM-to-GO before the shock to –0.6% in the coordinated scenario and –1.5% in the isolated scenario. All other sectors would have maintained positive GOMs and their relative declines would have been contained below the 3 p.p. in both of our policy scenarios – except for the case of petroleum refining which, besides its positive GOM, would have experienced a –9.4% decline.

Figure 1 – *Change in sectoral prices after the shock*



Turning to Italy (table 1), there are only four branches that would gain negative GOM-to-GO in the energy shock scenario: the first is basic metals, from 5.9% before the shock to –8.0% and –8.6% in the coordinated and isolated cases, respectively. The second is electricity & gas supply, from 22.2% to –2.0% in both cases; the third is petroleum refining, from 3.8% to –2.7/–

2.8% respectively; and the fourth is postal services, from 1.3% to –1.6% in the coordinated and –2.8% in the isolated scenario. Few other sectors would suffer significant relative reductions, especially chemicals, logistics, mining, non-energy products, and health and social services. In the Italian case, 11 out of 44 sectors would show low but still significant GOM-to-GO reductions in relative terms, between 3 and 1 p.p. The remaining sectors would not suffer the energy price shock at all.

Finally, Spain (table 3) shows a very modest overall impact on sectoral GOM-to-GOs. It is interesting to note that only petroleum refining would go negative after the energy shock, from 6.4% before the shock to –5.2% in the coordinated scenario and –5.3% in the isolated scenario. Other important relative declines would be in electricity & gas supply, basic metals, mining services and chemicals. All the other branches would suffer negligible losses.

In conclusion, although significant in some branches of the economy, the reduction in gross operating margins that would have been necessary to contain the inflationary dynamics that occurred in the last two years is relatively small overall. More importantly, the sectors that would have suffered most from the reduction in margins are sectors that, before being subjected to privatization and liberalization processes, were under state control – and it seems reasonable to conclude, good candidates to return to it.

Figure 2 – *Wage share in selected countries, 1960-2023*

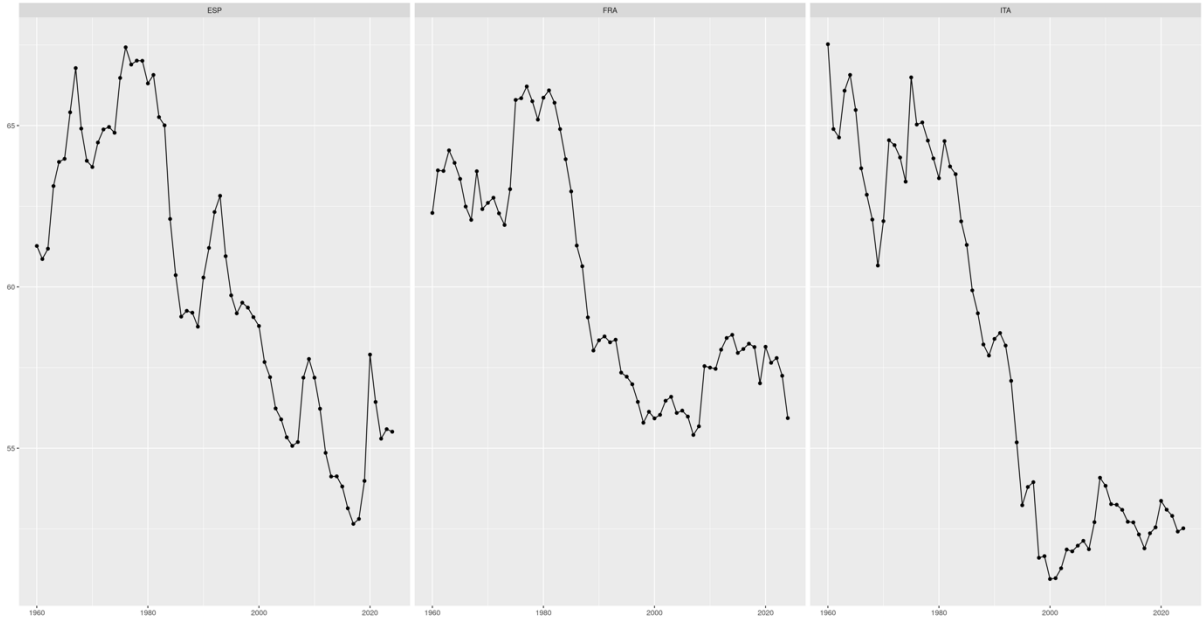


Table 1 – *Gross Operating Margins (as percentage of Gross Output) in different scenarios. Italy*

ITA	desc	before	coordinated	isolated
24	Basic metals	5.95	–7.96	–8.59
19	Coke and refined petroleum	3.84	–2.73	–2.83
35	Electricity, gas, steam supply	22.24	–2.06	–2.09
53	Post and couriers	1.29	–1.58	–1.62
20	Chemicals	11.35	3.10	2.53
85	Education	8.35	6.39	6.38
10T12	Food, beverages and tobacco	9.96	7.38	7.27
29	Motor vehicles	10.04	9.78	9.55
30	Other transport equipment	10.75	10.58	10.39
27	Electrical equipment	11.10	10.97	10.63
51	Air transport	11.90	11.18	11.10
28	Machinery and equipment, nec.	11.63	11.49	11.31
23	Other non-metallic minerals	13.46	12.14	11.95
17T18	Paper and printing	13.63	12.49	12.29
22	Rubber and plastics	12.65	12.55	12.10
13T15	Textiles and footwear	14.24	13.96	13.85
50	Water transport	14.81	14.15	14.06
26	Electronic and optical equipment	14.40	14.28	14.05
21	Pharmaceuticals	17.37	14.75	14.50
36T39	Water supply, waste management	16.88	14.93	14.86
25	Fabricated metal	15.63	15.49	15.24
77T82	Administrative services	16.36	15.66	15.63
31T33	Manufacturing nec	16.23	15.87	15.69
86T88	Health and social work	20.55	16.46	16.40
52	Warehousing, support to transport	24.43	17.30	17.25
58T60	Publishing and broadcasting	17.74	17.31	17.28
16	Wood and cork	17.40	17.34	17.18
41T43	Construction	18.44	18.20	18.13
84	PA, defence, social security	21.97	19.66	19.65
90T93	Entertainment and recreation	22.49	20.37	20.33
62T63	IT	23.35	23.11	23.08
55T56	Accommodation and food service	26.78	24.00	23.96
9	Mining support	27.49	25.86	25.83
49	Land transport	27.34	27.20	27.14
64T66	Finance and insurance	30.30	29.85	29.84
45T47	Trade, repair of vehicles	30.94	30.51	30.47
3	Fishing	31.47	31.38	31.30
61	Telecommunications	34.25	34.09	34.06
69T75	Professional activities	41.45	40.78	40.74
94T96	Other services	41.50	41.11	41.05
01T02	Agriculture	41.85	41.79	41.69
07T08	Mining, non energy	50.70	45.08	45.06
68	Real estate	86.37	86.30	86.30

Table 2 – *Gross Operating Margins (as percentage of Gross Output) in different scenarios. France*

FRA	desc	before	coordinated	isolated
35	Electricity, gas, steam supply	19.71	–5.33	–5.48
24	Basic metals	7.39	–0.63	–1.53
53	Post and couriers	0.15	0.12	0.07
19	Coke and refined petroleum	10.75	1.34	1.20
50	Water transport	4.51	4.33	4.17
16	Wood and cork	7.77	7.76	7.62
13T15	Textiles and footwear	7.96	7.86	7.60
28	Machinery and equipment, nec	8.29	8.26	7.82
31T33	Manufacturing nec	8.78	8.72	8.40
29	Motor vehicles	9.14	9.08	8.60
27	Electrical equipment	9.35	9.33	8.83
30	Other transport equipment	9.65	9.58	9.32
10T12	Food, beverages and tobacco	10.21	9.67	9.54
51	Air transport	10.18	9.92	9.72
85	Education	9.96	9.92	9.90
25	Fabricated metal	10.14	10.12	9.50
17T18	Paper and printing	10.29	10.13	9.84
22	Rubber and plastics	10.87	10.84	10.24
3	Fishing	11.46	11.40	11.05
64T66	Finance and insurance	12.22	12.21	12.19
69T75	Professional and technical activities	12.73	12.70	12.65
20	Chemicals	15.69	12.82	12.29
23	Other non-metallic minerals	13.10	12.93	12.66
49	Land transport	13.25	13.08	12.95
07T08	Mining, non-energy	15.43	14.11	13.71
41T43	Construction	14.25	14.16	13.97
90T93	Entertainment and recreation	14.35	14.33	14.27
45T47	Trade, repair of motor vehicles	16.55	16.52	16.44
58T60	Publishing and broadcasting	17.46	17.45	17.34
94T96	Other services	18.37	18.31	18.24
84	PA, defence, social security	18.54	18.39	18.35
77T82	Administrative services	18.50	18.47	18.42
62T63	IT	18.88	18.88	18.84
36T39	Water supply, waste management	19.62	19.53	19.35
55T56	Accommodation and food service	20.30	20.17	20.10
26	Electronic and optical equipment	21.61	21.60	21.36
86T88	Health and social work	22.46	22.44	22.41
52	Warehousing and support to transport	23.44	23.40	23.32
21	Pharmaceuticals	29.49	29.34	29.10
61	Telecommunications	29.62	29.58	29.52
01T02	Agriculture	31.41	31.37	31.17
9	Mining support	54.65	52.54	52.43
68	Real estate	78.32	78.32	78.30

Table 3 – *Gross Operating Margins (as percentage of Gross Output) in different scenarios. Spain*

ESP	desc	before	coordinated	isolated
19	Coke and refined petroleum	6.41	–5.18	–5.32
53	Post and couriers	0.67	0.63	0.60
24	Basic metals	12.09	6.66	5.87
29	Motor vehicles	7.79	7.77	7.30
25	Fabricated metal	9.04	8.95	8.23
51	Air transport	9.22	9.09	8.91
27	Electrical equipment	10.22	10.17	9.65
16	Wood and cork	10.22	10.19	9.95
62T63	IT	10.37	10.36	10.31
85	Education	10.42	10.41	10.38
10T12	Food, beverages and tobacco	10.79	10.77	10.65
9	Mining support	15.02	11.06	10.74
30	Other transport equipment	11.43	11.41	11.17
20	Chemicals	12.84	11.52	10.89
28	Machinery and equipment, nec	11.77	11.74	11.27
22	Rubber and plastics	12.13	12.08	11.65
23	Other non-metallic minerals	12.60	12.23	11.89
17T18	Paper and printing	13.97	13.95	13.68
86T88	Health and social work	14.08	14.07	13.99
35	Electricity, gas, steam supply	33.69	15.31	15.04
84	PA, defence, social security	17.28	17.20	17.16
26	Electronic and optical equipment	17.56	17.55	17.30
36T39	Water supply, waste management	18.13	18.10	17.95
31T33	Manufacturing nec	18.74	18.72	18.53
50	Water transport	19.18	19.00	18.85
58T60	Publishing and broadcasting	19.28	19.24	19.14
49	Land transport	20.53	20.36	20.20
69T75	Professional and technical activities	20.68	20.62	20.56
77T82	Administrative services	21.06	21.02	20.97
07T08	Mining, non-energy	22.25	21.71	21.46
52	Warehousing and support to transport	22.75	22.73	22.60
41T43	Construction	24.22	24.22	24.07
3	Fishing	26.15	26.07	25.94
45T47	Trade, repair of motor vehicles	28.21	28.03	27.96
55T56	Accommodation and food service	29.18	29.17	29.10
90T93	Entertainment and recreation	30.17	30.13	30.09
21	Pharmaceuticals	30.56	30.52	30.24
61	Telecommunications	31.09	31.07	30.99
64T66	Finance and insurance	31.35	31.34	31.33
13T15	Textiles and footwear	31.94	31.93	31.78
94T96	Other services	36.39	36.38	36.34
01T02	Agriculture	47.50	47.48	47.35
68	Real estate	82.01	82.00	82.00

4. Concluding remarks

Our results indicate that, on average, between 2018 and 2022, companies raised prices more than needed to maintain their levels of profitability in each of the considered European economies. Therefore, to a certain extent inflation hikes were led by surging markups in what might be considered in all respects a profit mark-up-price spiral (Storm, 2023).

Moreover, had prices remained at the same level as before the energy shock, and had there been a policy of price – and thus profit – control, only a few sectors would had had difficulties in meeting ends: indeed, in most industries, profitability would have remained positive. Measures such as price controls and taxes over excess profitability would have been helpful in reducing inflation and protecting the purchasing power of the working class. And they were, indeed.

As a matter of fact, France is the country with the lowest accumulated inflation over the period considered, even if it is the second most affected by our simulated energy shock. As has been acknowledged by ING (2022), the low increase of France's inflation rate "is due to the actions put in place by the French government to limit the impact of rising energy prices on households, including the 'tariff shield' which locks the price of gas at its 2021 level [and] the capping of the price of electricity at a maximum increase of 4% in 2022".

The case of Spain is similar – and maybe even more important (Uxó, 2023), although the price controls began later (in mid-2022). As established by the Bank of Spain (Velez, 2023), the price cap on gas applied in this economy has been an important measure in turning its inflation rate from one of the highest in the Eurozone during 2021 and 2022 to one of the lowest in 2023. Despite unprecedented increases in the legal minimum wage, the Spanish annual inflation rate stood at 1.6% in June (Eurostat, 2023a).

The need to introduce some form of price control is also debated in the Italian economy, as evidenced by the proposals on administrative pricing in the airline and agrifood sectors put forward by the Ministry of Business and Made in Italy (Ministero delle Imprese e del Made in Italy, 2023; Sole24Ore, 2023). It is too early to know whether these measures will actually be introduced or if they used as a kind of moral suasion towards companies. We are convinced that the price control system must be more extensive, otherwise some sectors – agrifood first and foremost – risk being crushed by the increase in intermediates. Therefore, we need a price control that includes at least the most important intermediates.

Our empirical exercise also shows that the price control should be conducted at the European level, otherwise the individual country must also absorb on its gross operating margins not only the increase in energy inputs but also the rise in intermediates imported from abroad.

While are no magic solutions that would reduce inflation and define real wages – that would require a complex mix of policies – price control is an important part of the picture, especially given the weakness of the trade unions at this moment, which limits their ability to obtain the increases in the negotiated wages necessary to keep real wages constant. This policy must be accompanied by other initiatives, starting with the return of the European energy markets to the regime that existed prior to the liberalization process. A process of selective nationalization in the energy sector is not only possible – as demonstrated by the French case of EDF (Mallet and Thomas, 2022) – but more urgent than ever, considering future market fluctuations related to the transition to renewables.

Finally, the current price dynamic fits perfectly into a conflict theory of inflation (Lavoie, 2014; Morlin, 2023; Stirati, 2001), resulting from the conflicting income claims made by workers and firms and influenced by the relative bargaining power of the two groups. At the same time, conflict inflation models are usually centred on wage claims, while here the conflict comes from big companies who, taking advantage of the inflation excuse, a war-focused narrative, and dramatic worker weakness, increase profits because they have the power to do so. This is definitely a distributive conflict, just very unbalanced and almost one-sided.

That said, the data we have used are aggregated data by branch, so they yield average results, which do not take into account the differences between production units making up each branch. Company size is also relevant: larger companies, for example, will presumably be able to negotiate more favourable prices with suppliers, or have more liquidity, or easier access to credit. Smaller companies, on the other hand, will suffer the same increases as end consumers and are therefore more vulnerable and exposed to the possibility of not being able to meet them. This means that the dynamics of gas prices could cause not only a further redistribution of income from wages to profits, but also a change in the capital structure in favour of large corporations – in other words, an increase in centralisation (Bellofiore et al., 2015; Bellofiore and Halevi, 2012). Some markups will be decreased, and others increased at the firm level, but this also means that the market power of a few large companies increases, exacerbating the oligopolistic nature in various industries and thus the vicious circle underlying the current inflationary process.

Although the prevalence of small and medium-sized enterprises is, in our opinion, a problem, the increase in company size should be an industrial policy objective to be pursued through state-controlled and state-led aggregation policies, not passively suffered as a result of market dynamics – which tend to reward undesirable characteristics of large enterprises such as the ability to exert greater exploitation of labour and the environment, especially when dealing with multinationals. This may make workers more vulnerable to relocation and the compression of trade union rights.

Secondly, we are aware that producer prices, as well as income flows and the nominal value of some assets, may also be affected by price hikes in raw materials besides gas, as well as by the evolution of exchange rates. The analysis of these aspects would require a separate investigation given the difficulty of incorporating this generally lacking data. It should be remembered, however, that the price shock simulated is remarkably higher than the one actually experienced by most economies, and that our results are robust enough to take them as a good approximation to what has actually happened in the inflationary processes of the European economies taken into consideration.

References

Araki S., Cazes S., Garnero A. and Salvatori, A. (2023), Under pressure: Labour market and wage developments in OECD countries. Available at: https://www.oecd-ilibrary.org/employment/oecd-employment-outlook-2023_b3013c36-en.

Arce O., Hahn E., Koester G. (2023), "How tit-for-tat inflation can make everyone poorer", *European Central Bank,* March 30. Available at: https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog.230330~00e522ecb5.en.html.

Bellofiore R., Garibaldo F. and Mortagua M. (2015), "A credit-money and structural perspective on the European crisis: why exiting the euro is the answer to the wrong question", *Review of Keynesian Economics*, 3 (4), pp. 471-490.

Bellofiore R. and Halevi J. (2012), "Deconstructing labour. A Marxian-Kaleckian perspective of what is 'new' in contemporary capitalism", in Gnos C., Rochon L. and Tropeano D. (eds.), *Employment, growth and development. A post-Keynesian approach* (pp. 11-27), Cheltenham: Edward Elgar Publishing.

Bohanon C. and Horowitz J. (2022), "Yes, printing money during COVID led to inflation", *Indianapolis Business Journal*, December 2. Available at: https://www.ibj.com/articles/cecil-bohanon-john-horowitz-yes-printing-money-during-covid-led-to-inflation.

Bureau of Labour Statistics (2023), *CPI for All Urban Consumers* (CPIU), Available at https://www.bls.gov/cpi/data.htm.

Carnevali E. and Deleidi M. (2023), "The trade-off between inflation and unemployment in an 'MMT world': an open-economy perspective", *European Journal of Economics and Economic Policies*: *Intervention*, 20 (1), pp. 90–124. Available at: https://www.elgaronline.com/view/journals/ejeep/20/1/article-p90.xml.

Christians A. and Magalhaes D. (2020), "It's time for pillar 3: A global excess profits tax for COVID-19 and beyond", *Tax Notes International*, May 4, pp. 507–510.

Colonna F., Torrini R. and Viviano E. (2023), "The profit share and firm mark-up: How to interpret them?", *Banca d'Italia Occasional Papers*, no. 770, Rome: Banca d'Italia.

Cucignatto G. and Garbellini N. (2022), "Lo scontro per le materie prime e la necessità di una nuova politica industriale", *Moneta e Credito*, 75 (298): pp. 185-202.

European Central Bank (2023), *The impact of the recent inflation surge across households*, Frankfurt am Main: European Central Bank. Available at https://www.ecb.europa.eu/pub/economic-bulletin /articles/2023/html/ecb.ebart202303_02~037515ed7d.en.html.

Eurostat (2023a), *Annual inflation down to 5.5*, Luxembourg-Kirchberg :Statistical Office of the European Communities, Available at: https://ec.europa.eu/eurostat/documents/2995521/17179282/2%20-19072023-AP-EN.pdf/bf200c74-48a4-e485-3372-c1fd1083c169.

Eurostat (2023b), *HICP - monthly data (annual rate of change)*, Luxembourg-Kirchberg :Statistical Office of the European Communities, Available at: https://ec.europa.eu/eurostat/databrowser/view /PRC_HICP_MANR__custom_6780718/default/table?lang=en.

Eurostat (2023c), *Labour costs annual data - NACE Rev. 2,* Available at: https://ec.europa.eu/eurostat/databrowser/view/TPS00173/default/table?lang=en.

Galbraith J. (1980) (ed.), *A theory of price control*, Cambridge, (MA): Harvard University Press.

Galbraith J. (2022), "The case for strategic price policies", *Project Syndicate*, January 21, Available at: https://www.project-syndicate.org/commentary/strategic-price-controls-warranted-to-fight-inflation-by-james-k-galbraith-2022-01.

Hebous S., Prihardini D. and Vernon N. (2022), "Excess profit taxes: Historical perspective and contemporary relevance", *IMF working Paper*, Washington (DC): IMF.

Henderson D.R. (2023), "Saying no (again) to wage and price controls", *Hoover Institution,* February 2. Available at: https://www.hoover.org/research/saying-no-again-wage-and-price-controls.

ING (2022), "France: Inflation rises again, but remains reasonable", *Economic and Financial Analysis*, February 25. Available at: https://think.ing.com/articles/france-inflation-rises-again-but-remains-reasonable#a2.

International Monetary Fund (2023), "Europe's inflation outlook depends on how corporate profits absorb wage gains, Washington (DC): IMF, June 23. Available at: https://www.imf.org/en /Blogs/Articles/2023/06/26/europes-inflation-outlook-depends-on-how-corporate-profits-absorb-wage-gains.

Lampa R. and Oro G. (2023), "Can the side effects of sanctions and energy inflation trigger the disintegration of the international monetary regime?", *PSL Quarterly Review*, 76 (306), pp. 225-242.

Lavoie M. (2014), *Post-Keynesian economics: New foundations*, Cheltenham: Edward Elgar Publishing.

Lavoie M (2023), "Some controversies in the causes of the post-pandemic inflation", *Monetary Policy Institute blog #77*, May 14, 2023. Available at: https://medium.com/@monetarypolicyinstitute/some-controversies-in-the-causes-of-the-post-pandemic-inflation-1480a7a08eb7

Ministero delle Imprese e del Made in Italy (2023), "Caro voli, riunita la commissione allerta rapida", July 20. Available at: https://www.mimit.gov.it/it/notizie-stampa/caro-voli-riunita-la-commissione-allerta-rapida.

Morlin G. (2023), "Inflation and conflicting claims in the open economy", *Review of Political Economy*, 35 (3), pp. 762-790.

Niles R. C. (2023), "Wage and price controls are not the answer to inflation", *American Institute of Economic Research*, January 10. Available at https://www.aier.org/article/wage-and-price-controls-are-not-the-answer-to-inflation/.

OECD (2023), Inflation (CPI) (indicator). Available at https://data.oecd.org/price/inflation-cpi.htm. (Accessed on 17 July 2023).

Office for National Statistics (2023), "Consumer price inflation time series", October 18. Available at: https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindices.

Mallet B. and Thomas L. (2022), "France starts process to fully nationalise power group EDF", *Reuters*, October 4. Available at https://www.reuters.com/business/energy/france-keeps-edf-buyout-offer-12-euros-per-share-filing-2022-10-04/

Sole24Ore (2023), "Inflazione: paniere a prezzi calmierati per i beni di largo consumo", July 21. Available at: https://www.ilsole24ore.com/art/prezzi-prodotti-largo-consumo-governo-lavora-un-paniere-calmierati-AFr9W1I

Stirati A. (2001), "Inflation, unemployment and hysteresis: An alternative view", *Review of Political Economy*, 13 (4): pp. 427–451

Storm S. (2023), "Profit inflation is real", *PSL Quarterly Review*, 76 (306), pp. 243-259.

Summers L. (2021), "Opinion: The Biden stimulus is admirably ambitious. But it brings some big risks, too", *Washington Post*, February 4. Available at https://www.washingtonpost.com/opinions/2021/02/04/larry-summers-biden-covid-stimulus/

Summers L. (2022), "We spent the day with Larry Summers, the economist who predicted inflation would spiral out of control. He's still afraid", *Fortune Magazine*, September 23. Available at https://fortune.com/2022/09/23/larry-summers-inflation-economy-housing-stock-market-outlook/

Uxó González, J. (2023), "Inflation and counter-inflationary policy measures: The case of Spain", *Wirtschaft und Gesellschaft*, 48 (4), pp. 545–577.

Vague R. (2016), "Rapid money supply growth does not cause inflation", *Institute For New Economic Thinking*, December 2. Available at https://www.ineteconomics.org/perspectives/blog/rapid-money-supply-growth-does-not-cause-inflation.

Velez A. (2023), "El Banco de España calcula que el paquete anticrisis del Gobierno restó 2,3 puntos a la inflación de 2022 y elevó el PIB un 1,1", 26 April, *ElDiario.es*, Available at: https://www.eldiario.es/economia/banco-espana-calcula-paquete-anticrisis-gobierno-resto-2-3-puntos-inflacion-2022-elevo-pib-1-1_1_10152207.html.

Vernengo M. and Perez E (2023), "Price and prejudice: A note on the return of inflation and ideology", *PKES Working Paper*, n. 2302.

Visco I. (2023), "Inflation expectations and monetary policy in the euro area", *Banca d'Italia*, 23 March. Available at: https://www.bancaditalia.it/pubblicazioni/interventi-governatore/integov2023/VISCO_23marzo2023.pdf?com.dotmarketing.htmlpage.language=1.

Weber I. (2021), *How China escaped shock therapy: The market reform debate*, London: Routledge.

Weber I. and Wasner E. (2023), "Sellers' inflation, profits and conflict: Why can large firms hike prices in an emergency?", April 14. Available at: https://www.elgaronline.com/view/journals/roke/11/2/article-p183.xml.