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COST-PUSH AND CONFLICT INFLATION IN THEORY AND PRACTICE - WITH A DISCUSSION OF THE ITALIAN CASE

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ABSTRACT

This study contributes to the ongoing discussion surrounding the recent upswing in inflation by presenting an analytical framework and empirically examining inflation trends in Italy. Its primary aim is to unveil the underlying causes, distributive repercussions, and mechanisms through which inflation spreads. We adopt a cost-push and distributive conflict perspective on current inflation. Within this perspective, some contributions argued for a profit-driven inflation, while others dispute this interpretation. They emphasize that increases in profit share or operating surplus, especially amid rising import costs, do not necessarily translate to heightened overall profitability. To disentangle these intricacies, the paper puts forth an analytical framework that clarifies how escalating import costs can elevate profit shares and set in motion inflationary processes, even in the absence of explicit conflicts over income distribution. Turning attention to the Italian context, the study utilizes descriptive statistics, sectoral data, and simple simulations to gain insights into the drivers of inflation and its distributive consequences. Additionally, a Structural Vector Autoregressive (SVAR) model is deployed to uncover the nature and timing of the propagation process. The paper concludes with some policy implications based on the findings.

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Cost-push and conflict inflation in theory and practice - with a discussion of the Italian case

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Abstract

This study contributes to the ongoing discussion surrounding the recent upswing in inflation by presenting an analytical framework and empirically examining inflation trends in Italy. Its primary aim is to unveil the underlying causes, distributive repercussions, and mechanisms through which inflation spreads. We adopt a cost-push and distributive conflict perspective on current inflation. Within this perspective, some contributions argued for a profit-driven inflation, while others dispute this interpretation. They emphasize that increases in profit share or operating surplus, especially amid rising import costs, do not necessarily translate to heightened overall profitability. To disentangle these intricacies, the paper puts forth an analytical framework that clarifies how escalating import costs can elevate profit shares and set in motion inflationary processes, even in the absence of explicit conflicts over income distribution. Turning attention to the Italian context, the study utilizes descriptive statistics, sectoral data, and simple simulations to gain insights into the drivers of inflation and its distributive consequences. Additionally, a Structural Vector Autoregressive (SVAR) model is deployed to uncover the nature and timing of the propagation process. The paper concludes with some policy implications based on the findings.

Keywords: inflation, cost-push, mark-up, distribution; Italian economy

JEL codes: E31; E12; E2

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1. Introduction

The main purpose of this paper is to contribute to the current debates on the nature and drivers of the recent inflation surge, by proposing a framework of analysis and by means of the empirical analysis of inflation in Italy, looking at its causes, distributive effects, and propagation mechanisms.

The sudden re-emergence of high inflation has given rise to a lively debate on its causes that involves both the appropriate analytical framework and the empirical inquiry into the main determinants of inflation. In this context, the statement by Blanchard (2022) that inflation has its sources in conflicting claims over income has elicited reactions from Post-Keynesian economists who have vindicated their primacy in proposing that theory of inflation. As noted by Lavoie and Rochon (2023), however, Blanchard had indeed proposed a conflicting claims interpretation of inflation already in an article published in 1986. But: is everyone talking of the *same* conflicting claims theory? We argue in the first part of this paper (Section 2) that this is not necessarily the case. Subsequently (Section 3), we discuss current interpretations of the causes of the current surge of inflation, and whether it can be interpreted as the result of conflict over income distribution. Actually, many contributions interpret the current inflation as profit-driven, but other scholars have objected to this view, and among other things have noted that increases in the profit share or operating surplus, in a context of increasing import costs, are not necessarily evidence of an increase in profitability. We propose (Section 4) an analytical framework that can be useful to understand how increases in import costs can give rise to increases in the share of profit (or mark-up) and to a process of propagation of inflation, even when no conflict is taking place over income distribution (i.e. keeping nominal distributive variables constant), and what would be the possible scenarios in the case such conflict develops. We then address the Italian case, looking at descriptive statistics, sectoral data, and very simple simulations to try to understand what the drivers of inflation and its distributive impact have been (Section 5) and use a SVAR model to better understand the nature and timing of the propagation process (Section 6). We conclude and discuss policy implications in the last section.

2. Different approaches to conflict inflation

To clarify matters, albeit at the cost of some simplifications, we can distinguish two approaches to conflicting claims inflation. The first one is the one proposed by Blanchard in his above-mentioned 1986 article and shared by most New Keynesian models and textbooks. Its distinguishing features are that i) conflict inflation does not affect income distribution, which remains unaltered at least in the medium run; ii) there is an equilibrium unemployment rate that is a *de facto* attractor either through

spontaneous market mechanisms or through policy: most often monetary policy, but some authors (particularly in the non-mainstream camp) would argue that fiscal policy may also be used to restore such equilibrium unemployment. The latter shares the *macroeconomic* features of the natural unemployment rate and of the NAIRU, and specifically the 'accelerationist' property that out-of-equilibrium inflation or deflation would be increasing over time.

Since the NAIRU is the unemployment level necessary to discipline the workers into accepting a real wage consistent with the *given* mark-up, as such it attracts some consensus also by non-mainstream economists that regard this modeling as an acceptable representation of the notion that a certain 'reserve army' is necessary in a capitalist economy to keep real wages in check and profitability in line with firms aspirations (Stockhammer, 2008). The condition that the mark-up (and hence the profit rate that it must comprise) is *given in real terms* can be seen as the assumption that underlies the two features listed above. The accelerationist view also requires that workers can always aim at, and obtain, that inflation passes through into nominal wage growth (although real wages never manage to grow, other things given, since firms can fix the real mark-up). In this perspective, inflation is generally regarded as the consequence of excess demand, bringing the actual unemployment rate below the NAIRU (Lavoie, 2022, p. 594).

There is however a second approach to conflict inflation, which is shared by many non-mainstream economists, but has found, indirectly, empirical support also in mainstream empirical literature concerning hysteresis of output and (un)employment. Its main feature is that the conflict that underlies inflation can indeed alter income distribution persistently, depending on the bargaining strength of the parties involved, which in turn may depend on several circumstances concerning the labor market and its regulation, as well as macroeconomic conditions and constraints (Stirati 2001; Paternesi Meloni and Stirati 2018; Serrano, 2019; Summa and Braga 2020; Braga and Serrano 2023; Romaniello, 2023). Accordingly, there is neither a *given* mark-up in real terms nor a NAIRU; the unemployment rate depends on aggregate demand and hence, to a large extent, on fiscal policies; its changes may affect the inflation *rate*, but acceleration is regarded as a rare phenomenon, as confirmed by empirical evidence (Alvarez et al. 2022), most often caused by repeated exogenous shocks, particularly on exchange rates, rather than by internal labor market conditions concerning the unemployment rate; though the role of unemployment in affecting nominal wage dynamics and real wage levels is widely acknowledged. This view is based on an analytical framework in which income distribution is always, *even in conditions of free competition*, the result of power relations along with social norms and institutions, and inflation not only is the outcome of conflict over income distribution but may also be the channel that brings about changes in income distribution that reflect those power relations (Stirati 2001). Within this framework, inflation is regarded as usually initiated

by cost-push from worsening of terms of trade or sustained nominal wage dynamics made possible by the enhanced bargaining power of wage earners. The latter may be the consequence of persistently low unemployment or institutional and political changes but is not necessarily or generally the result of *excess demand* for labor or products (Braga and Serrano 2023); similarly, sustained and persistent growth in world demand tends to cause increases in primary commodity prices, which however may not be connected with an excess demand as such, but with enhanced negotiating power of suppliers, or the need to resort to more costly sources of energy or other primary commodities. These cost-push factors then set-in processes of price-wage or wage-price spirals as parties attempt to preserve or enhance, their real earnings, but with both parties, workers and firms, normally unable to fully and immediately index them to cost and price changes.

The recent resurgence of inflation however, for the moment, does not seem to completely fit the above description in the sense that, while a terms of trade shock is clearly detected and has been very large in Europe, very little 'conflict' seems to be taking place on the part of wage earners. Real wages are falling everywhere and (for the moment) nominal wage dynamics have remained very moderate. In the Eurozone (Arce et al. 2023, chart 1, p. 2 and Hansen et al. 2023, p 13) and in Italy, our case study, nominal wage growth has been, on average, in the last two years, around two percent per year, thus actually in line with the ECB inflation target.

Below, we survey different interpretations of current inflation.

3. Controversies on the interpretations of the current inflation

In the US, where inflation has been high, but energy costs have not increased as much as in Europe, important economists such as Blanchard (2022) and Summers (2021) suggest that it is excess aggregate demand, caused by excessive fiscal stimulus, that has triggered a conflict over income distribution in the form of a wage-price spiral. Blanchard (2023) suggested that several routes (such as subsidies, or centralized negotiations) are available to keep inflation under check and it is better to avoid recessions induced by monetary tightening. Yet the fiscal stance, following this view, should be much more prudent than in the recent past.

This interpretation of the US inflation has been criticized on empirical grounds by Ferguson and Storm (2022), who show that the timing of fiscal expansion and inflation surge are not consistent with the Blanchard or Summers interpretation; in addition, real wages are losing ground, thus casting doubt on wage dynamics as the underlying factor in the surge of inflation, as suggested for example by Summers (Klein, 2022). By contrast, Ferguson and Storm argue that there has been a price-price spiral, whereby firms have been able to increase their margins (mark-ups) – in other words, a 'profit' inflation would be at play as manifested by the increase in the ratio of the (gross) operating surplus

on value added. Claims and evidence on 'profit inflation' have been advanced also by other contributions: Weber and Wasner (2023) argue that price fixing by firms is such that an increase in costs can give rise to a coordinated increase in prices that allows a complete pass-through of costs but also, particularly in instances of supply shortages and disruptions, to price increases that allow an increase in profitability and use data from company budgets to provide empirical support to their interpretation; Arce et al. (2023); Bivens (2022); Panetta (2023) follow a similar view mostly on the basis of a historically high ratio of operating surplus to real value added; Hansen et al. (2023), though they do not detect a generalized increase in profitability (as distinct from the profit share or GOS), admit that in some industries reduction of productive capacity during the pandemic and/or fast demand growth might have provided firms with pricing power (pp 15-16). Cucignatto and Garbellini (2023) using input-output data for the largest European economies, including Italy, show that between 2018 and 2022 the increased direct and indirect costs due to a five-fold increase in gas prices on the Dutch market would have caused, other things equal, an increase in price indexes much lower (between 3,5 and 4% in the Italian case), than their actual cumulative increase (about 11% in the Italian case). Hence, they also support a 'profit inflation' interpretation of the current inflation. If these interpretations are correct, we would witness a cost-push plus conflicting-claims inflation where the increasing claims are one-sided and come from firms who see an opportunity to increase margins, taking advantage of a (much lower) exogenous increase in costs, while nominal wages can barely recover just a fraction of those price increases. Inflation therefore would be operating a (further) redistribution of income away from labor and in favor of profits.

Some non-mainstream authors have objected to the view that profit increases are major drivers of current inflation. Lavoie (2023), based on Canadian data, has argued that the increase in the operating surplus share in value added is in line with the cyclical behavior of the latter; therefore does not necessarily reflect an increase in profitability due to pricing behavior but is a common feature during a recovery: the profit share on GDP typically exhibits a pro-cyclical behavior owing to overhead labor costs, labor hoarding and so on, such that productivity increases rapidly in recovery and more rapidly than real wages. In addition to this, the profit share can increase owing to the impact of the increased costs of the material (imported) intermediate inputs. Some doubts concerning 'profit inflation' are raised also by Vernengo et al. (2023) who show, based on US data, that energy prices and consumer price index have tended historically to move closely together, in a way very similar to what has been going on in 2021-2022. They also predict, given the subdued nominal wage growth and the temporary nature of the energy price increase that inflation will continue to slow down, as already did happen to a considerable extent in the last part of 2022- beginning of 2023.

A much-cited paper by IMF researchers (Hansen et al. 2023) looking at data for several mature economies including the Eurozone, does not find clear evidence of an increase in profitability or margins over variable costs, despite the increase in the profit share and the contribution of unit profits to the increase in GDP deflator and consumer price index. According to the authors, the increase in unit profits may be due to increasing variable costs as well as to the ability of firms to (partly or fully) pass-through the increases in costs.

In addition to those empirical objections, profit inflation is also not so easily accepted, from an analytical point of view, even on the part of non-mainstream economists, since it seems to violate the notion that competition is a disciplining force in the economy. Even when elements of monopoly, oligopoly, or product differentiation give some firms market power, the threat of entry into the industry as well as competition in product markets should keep extra-profits in check. Finally, this interpretation of inflation raises the question of why, if firms can increase prices to satisfy their greed for higher profits, they did not do it already before? On the other hand, it may not *a priori* be ruled out that, in a context of increasing costs and some supply disruptions, firms could try to take advantage of price increases elsewhere to increase their own prices above what can be justified by actual cost increases, in an implicitly coordinated way. Thus, none of the above doubts about the possibility of a 'profit inflation' should prevail on what emerges from the evidence, and some of those doubts are indeed confronted in the literature. They rather solicit careful analysis of the data and an attempt to provide sound interpretations. We will discuss Italian data below as a case study of the inflation surge, which can be of interest given its features concerning price and nominal wage dynamics. Before that, however, some analytical points in the following section.

4. Some analytical pointers

Following Stirati (2001) we can represent various inflation scenarios according to circumstances starting from nominal price equations of the type:

1) $P_t = P_{t-1} A (1 + i) + F_{t-1}(1 + i) + lw$

Where P is the *nominal* price vector, A is the matrix of domestically produced intermediate inputs, i is the nominal interest rate that represents the minimum benchmark return that has to be earned on the historical cost of capital inputs (e.g. interest rate earned on long term bonds), F is the cost in the national currency of imports per unit of output, w is the nominal (uniform) wage and l is the vector of labor inputs per unit of output. We are assuming given and constant (extra) profit margins (that we leave therefore out of the picture) and we neglect fixed capital inputs.

Note that, while with null inflation nominal interest rate on historic capital costs and real profit rate coincide, this is not the case when there is inflation; in this case, while competition tends to impose the nominal interest rate on historic capital cost as a benchmark, the real profit rate must be reckoned over the *replacement costs* of capital; in other words, a given constant nominal interest rate earned on historic cost of capital implies, if there is inflation, a decrease in the real profit rate, approximately equal to nominal interest rate minus inflation or, more precisely, minus the price inflation of the capital inputs specific to the industry.

Although this representation is less simple and intuitive than the usual aggregate variable costs and mark-up representation of price formation, it may improve the understanding of the propagation of the inflationary process. The usual mark-up representation of price formation is:

2) $P = (1 + m)\left(\frac{w}{pr} + f\right)$

where m is the mark-up, $\frac{w}{pr}$ are unit labor costs (i.e., nominal wage over real output per labor unit), and f are the imported inputs cost in national currency per unit of output. Of course, the mark-up must comprise profits along with other fixed costs of production (e.g. depreciation of fixed capital). While in some cases it may be useful to look at the aggregate economy as a vertically integrated sector and ignore intra-industry exchanges within the domestic economy, when analyzing inflationary processes this may lead to neglecting some important features of the propagation process. It may also lead to neglect that with a given nominal interest rate (pure remuneration of capital) and constant nominal wages, the mark-up over wage and foreign inputs costs would have to increase owing to the *increased prices of domestically produced inputs*. Equation 1) above shows how an increase in imported inputs costs (that is definitely a major factor in the current burst of inflation) - even under the assumption of constant nominal interest rate and nominal wage - will give rise to a succession of price increases, as gradually the increase in the cost of imported inputs enters into the prices of domestically produced intermediate inputs and hence causes several 'rounds' of increases in costs and prices that on the one hand would affect the statistical measures of 'core inflation', that is, net of imported energy costs, and on the other hand would reflect in an increased gross and net operating surplus over value-added, and an increase in the mark-up over labor and import unit costs in equation 2.

Since the increase of (gross) operating surplus over value added (the 'profit share') is very often used as a measure of increases in profits, it should be noted from equation 1 that, for a given *nominal* interest rate, both the term $\boldsymbol{F_{t-1}i}$ and the term $\boldsymbol{P_{t-1}Ai}$ – that is, total interests/pure remuneration of capital - would tend to increase relative to total value added along with the increases in the relative prices of imported inputs and, gradually, of *domestically produced inputs*. In the case of *gross*

operating surplus, there would also be (with a lag) an increase in the historical costs of circulating (and fixed) capital that would be reflected in the component of gross operating surplus meant to cover for the *replacement* of capital, that is, in our simplified example with circulating capital only, the terms $\boldsymbol{F_{t-1}}$ and $\boldsymbol{P_{t-1}A.}$[2]

Formally:

Suppose we have an increase in the cost of imported inputs of *m*, which for simplicity we assume to be a scalar. While nominal interest rate and nominal wages remain unchanged.

The price level *before* the change in the terms of trade in t=0 is

3) $\boldsymbol{P_0Q_0} = \alpha + \beta + \gamma = 1$

where α, β, γ are, respectively, the weight of the (historical) value of domestically produced inputs plus the nominal interests on it, the weight of the value of imported inputs plus interests, and the weight of labor cost on the value of output in the initial period and the above is the price index in the base year $t = 0$.

After the deterioration in the terms of trade by the rate *m*, the ratio of the 'final' price level to the initial price level converges to a finite value:

4) $\boldsymbol{P'Q/P_0Q_0} = 1 + [\beta m / (1 - \alpha)]$

where $[\beta m / (1 - \alpha)] < m.$

Demonstration: The difference between price levels at any time *t* after the change in the terms of trade is given by:

5) $\boldsymbol{P_tQ - P_{t-1}Q} = \alpha^{t-1} \beta m$

Since $a < 1$ the term on the right-hand side tends to zero for *t* tending to infinity. The overall increase in the price level at any time *t* is given by:

6) $\boldsymbol{P_tQ/P_0Q} = 1 + \sum_t \alpha^{t-1} \beta m$

[2] A similar point is raised in Lavoie (2023) and Colonna et al (2023).

The limit for t tending to infinity of the second term on the right-hand side is $\beta m/(1 - \alpha)$.

What can be of interest for the present analysis, among other things, is that*, even when domestic nominal distributive variables do not at all adjust to inflation and are assumed to remain constant* (which of course is not quite realistic) the initial impulse coming from import costs will give rise for some time to a process of inflation, involving the costs and prices of domestically produced inputs. This process will gradually subside (the inflation rate will tend to diminish) until the new higher but constant price level is reached. Although this is a rather abstract picture, rather than a realistic one, it sheds light on some of the processes of propagation that can be at work in feeding so-called 'core' inflation after a shock in imported energy prices.

Based on this apparatus and using results in Stirati (2001) we can try to consider different possible inflation scenarios depending on the behavior of terms of trade and nominal domestic variables:

1) Suppose the increase in the price level of imported inputs is a lasting one. Although the increase in energy prices is now declining, it is reasonable to suppose that, due to the geopolitical situation and the shift to more expensive sources of gas, along with the costs of the green transition, there will be a persistent increase in the price of energy inputs in Italy and other Eurozone countries, albeit significantly lower than what witnessed in 2022. However, if the increase is *a once-for-all nominal level increase*, the ensuing inflationary process will subside, even in the case in which both firms and workers will attempt to keep real wages and real profits constant by entirely passing through the increased costs (which, however, seems unlikely for workers in the current conditions). Inflation will subside because *as the domestic price level increases, this represents a reduction in the worsening of the terms of trade*, that is, the change in relative prices between imported inputs and domestic output. If, however, the increase in the cost of energy inputs is large, it may take a substantial time-lapse before the change in terms of trade is eroded by the increase in domestic prices. If some distributive variables fail to completely adjust for inflation, as is likely to be the case for wages under the present conditions, then when inflation dies out, wages will have lost in real terms due to the higher price level.
2) It is however reasonable to expect that the worsening of the terms of trade is a persistent one, i.e. that the *relative price* of imported energy inputs will be persistently higher *vis à vis* the domestic price level: this should be expected to occur to the extent the higher price of energy inputs are caused by structurally higher costs of production and transportation of gas, due to changed geopolitical conditions. If so, then the evolution of inflation very much depends on the reaction of domestic nominal variables, since some, or all, parties will have to accept a reduction in their real incomes (other things given, the deterioration of the terms of trade

implies a reduction in domestic income). In the assumption of only *partial* and lagged adjustment of nominal interest and nominal wages to inflation, the latter will eventually subside and stabilize; but it will be possible to share the burden between profit and wages only if workers can maintain a constant rate of *nominal wage* and price inflation, which erodes real profits for a given nominal interest rate (Stirati, 2001). The more so if, as it is happening, the nominal interest rate rises: if the increase is expected to be a lasting one, it will raise the minimum (nominal) benchmark return on advanced capital.

The above results are qualitatively similar to what presented by Lavoie (2022), in his chapter on inflation (although the set-up is partly different) as the general case, when there is no full indexation of earnings and there are lags in the adjustment of prices and wages. In such circumstances, inflation itself establishes a 'compromise' between conflicting claims (pp. 605-06 and 623-24). What I believe can be gained by the representation proposed here is that it provides an explicit recognition of the role of interindustry (and intra-firm) exchanges in the process of cost-push transmission. One take-home message is that some time-lag between the increase in import costs and the increase in prices is inherent in the input-output characteristic of the production process. One of the factors influencing the rapidity of the transmission (along with the staggering of contracts)[3] is likely to be the turn-over of circulating capital, which differs across industries, thus contributing to a staggering process.

Of course, if a certain rate of growth of productivity is introduced in the picture, both these scenarios become more likely to exhibit a reduction of inflation and to exhibit it to a higher degree than would otherwise be the case. In addition, the increase in energy costs that can be expected as a lasting one, albeit significant, is of an order of magnitude much lower than the increase witnessed between 2021 and 2022.

5. Empirical evidence and distributive impact: the case of Italy

In this section, we conduct an in-depth analysis of the Italian inflation surge from a sectoral perspective, emphasizing its distributive consequences. Our data sources encompass a variety of datasets obtained from the Istituto Nazionale di Statistica (ISTAT), with the timing of data usage dependent on availability. As a result, we use monthly data to illustrate price and inflation trends, quarterly data to assess changes in mark-ups, and annual data for examining distribution and the ex-post rate of profits. Our econometric analysis (Section 5) is conducted using quarterly data. Details and additional information regarding data sources and methodology are reported in the Appendix.

[3] Not just of labor contracts but, in the light of the discussion in the text, also intra-firms contracts and price revisions

5.1. Descriptive analysis of sectoral prices and the inflationary process: the role of energy and imported goods

As noted, Italy has experienced an unprecedented surge in inflation in the last two years, despite a long-lasting period of stagnant inflation rates. Figure 1 illustrates that the surge in the consumer price index began in August 2021 and reached its peak in October 2022, with an inflation rate of 12.6%. After this date, inflation began to consistently decrease, reaching 6.7% (on an annual basis) by June 2023, a level still higher than the inflation observed in the past two decades.

[FIGURE 1 HERE]

It is important to highlight that this surge was primarily driven by a significant increase in energy prices. Figure 2 provides evidence of this, showing that the price index of energy goods tripled compared to its value in 2018, becoming the main driver of the HICP index's upward trajectory. This is further illustrated by comparing the general HICP index (the black-solid line) with the index excluding energy, food, alcohol & tobacco (the red line).[4]

[FIGURE 2 HERE]

Although the level of energy prices started to decrease after October 2022, the general index continued to increase, albeit at a slower pace. In fact, after reaching its peak in the winter of 2022, the inflation rate stood at 8% in March 2023 and 6.7% in June.

To gain deeper insights into the factors driving this inflationary process, we turn our attention to industrial producer prices for the domestic market, as illustrated in Figure 3. Again, the price dynamics observed here are primarily associated with the energy sector.[5] Following a slight decrease since the early months of 2019, energy prices exhibited a consistent upward trajectory. This rate of increase gained momentum from the summer to the fall of 2021 and continued until December 2022. As depicted in Figure 3, energy prices nearly tripled in under two years, surging from 106 in July 2021 to 270 in December 2022.

In 2021, the prices of production for all categories of goods began to ascend. However, the prices of intermediate goods (indicated by the red line) exhibited a relatively more pronounced increase when compared to consumer goods (represented by the blue line) and capital goods (represented by the green line).

[4] This last index is the one used to calculate the so called "core inflation",

[5] The industry labelled 'Energy' includes the domestic extractive industry of energy raw materials (oil, natural gas, lignite), the refining industry, the production of electricity, gas and water, steam, the collection, purification and distribution of water.

[FIGURE 3 HERE]

Furthermore, the same producer price index, this time categorized by economic sector, shows that the price surge in energy *distribution* (the red line in right-side of Figure 3) outpaced that of energy goods *production* (the yellow line in right-side of Figure 3). In December 2022, the former reached a peak of 316, much higher than the latter, with a peak of 270. Lastly, when we differentiate between the price of the industrial sector excluding both construction and energy and the price that excludes only construction, we can discern that the latter has exhibited steeper price dynamics. This observation further confirms the pivotal role of energy prices in driving the overall increase in the price level.

[FIGURE 4 HERE]

Figure 4 illustrates the evolution of import prices. Among the various imported goods, energy prices exhibit the highest level of volatility and follow a similar trajectory as described earlier for the prices of domestically produced and distributed energy goods. Between May 2020 and September 2022, the price of imported energy nearly tripled, rising from 103.27 to 364.

Additionally, starting in January 2021, there is a noticeable upward trend in the prices of instrumental, intermediate, and consumption imported goods. However, among these categories, the price of intermediate goods experienced a more significant increase, climbing from 100 in January 2021 to 127 in July 2022.
A general observation is that both production prices and import prices of energy began to decrease as of December 2022.

5.2 The distributive effects of inflation: wages

The increase in inflation has raised concerns regarding wage dynamics, with some arguing against adjusting money wages to avoid a price-wage spiral (Schnabel, 2023; Visco, 2023). Figure 5 (left graph) provides an illustration of the path of nominal compensation. Since 2018, nominal compensation per hour worked has consistently shown a positive and increasing percentage change, reaching a peak in 2020. However, the 2020 figure reflects the peculiar situation created by the

pandemic, with the sharp reduction in employment in some low-wage service industries, and is therefore heavily distorted by large changes in the composition of the workforce.
In 2021, there was a modest reduction in the level of nominal compensation per hour worked, in 2022, the overall increase in nominal wages vis à vis 2019 was 7 percent points.

[FIGURE 5 HERE]

When examining real compensation and accounting for the interplay between price dynamics and wage dynamics (Figure 5, right-side), it becomes evident that a substantial decline in the level of real wages occurred after the COVID-19 pandemic. The very moderate growth of nominal wages combined with the resurgence in inflation, resulted in a significant decrease in real wages per hour worked. By 2022, the level of real wages had dropped to a point lower than that observed five years earlier in 2017 and 3 percent points lower than in 2019. This highlights the challenging nature of the inflationary environment and its detrimental effect, in the current situation, on the purchasing power of wage earners.

[FIGURE 6 HERE]

Additionally, the trajectory of the Adjusted wage share presented in Figure 6, further confirms the extent of the reduction in real wage per employee that occurred in 2022 and the deterioration of income distribution. Starting from that year, the share of wages in relation to value-added rediscovered a long-term negative trend.[6]

5.3 Distributive effects: profit share, mark-ups and profit rates

As discussed in Section 3, a growing body of literature is endorsing the idea that the increase in profits is the root of the inflation surge. As aptly noted in Hansen et al. (2023) it is not easy to capture the changes in profitability understood as the rate of return on capital – so it is appropriate to use several indicators or proxies. To deal with this, we analyze different measures: the profit share, the mark-up, the ex-post profit rate at aggregate and sectoral levels, and simple calculations based on the equations in Section 4.
One notable piece of evidence pertains to the evolution of the Profit Share.[7]As Figure 7 shows that the Profit Share has a relatively stable trajectory across all economic sectors, except for the construction sector, where it has been declining after 2008 and a partial recovery between 2018 and

[6] For an analysis of the negative trend of wage shares see Stirati and Paternesi, 2021. For the Italian case, see Levrero and Stirati, 2005 that investigate the evolution of relative prices and functional distribution in Italy.
[7] We define Profit Share the one's complement of the Adjusted wage share. Details on data are reported in Appendix.

2021. However, the energy sector stands out as it experienced a sudden and substantial increase in the Profit Share in 2021. It is important to note, however, that this alone does not serve as conclusive proof that the rate of profit, and consequently the share of profit in relation to the value of capital, has increased.

[FIGURE 7 HERE]

Figure 8 illustrates the evolution of the mark-up, which is defined by ISTAT as the ratio of the GDP deflator to the value of unit variable costs – that is, labor costs and *all* intermediate inputs per unit of output.

The trajectory of mark-ups within the broader economic context is intricately shaped by a multitude of trends in sector-specific mark-ups.

With the sole exception of the agricultural sector, all other sectors witnessed a diminishing trend in mark-ups from the second quarter of 2020 through the end of 2021. Subsequently, only moderate recovery ensued, with the noteworthy exception of the industrial sector (excluding construction but including energy), as evidenced by the green line.

A comparative analysis of this trend in relation to the black line, representative of the manufacturing sector, provides valuable insights into the trajectory of mark-ups within the energy sector. This is the case since the share of the energy sector (including both extractive activities and energy distribution) in the value added of the industrial sector, excluding construction, stands at 15%, while the manufacturing sector's share is 85%. Hence the comparison can provide an indication of the role played by the mark-up in the energy sector in influencing the overall trajectory of mark-up. Both trajectories exhibit parallel patterns until the zenith in the fourth quarter of 2020, from which point they commenced a downward trend. However, it is noteworthy that while mark-ups in the manufacturing sector experienced a substantial descent, reaching -3.12% by the third quarter of 2022, the industrial sector (which includes energy) exhibits a comparatively stable trajectory with a milder decline, registering -1.27%. This stability is likely due to the dynamics inherent to the energy sector, which compensated for the erosion of the mark-up in manufacturing.

The divergence persists during the subsequent phase of recovery. At the end of the period (1st quarter 2023), despite a recovery of the manufacturing mark-up, the difference was still 1,8 percent points in favor of industry. Back-of-the-envelope calculations based on the weights of the energy and manufacturing sectors, indicate that to compensate by 1.8 points for the decline of the manufacturing mark-up, the mark-up in the energy sector should have increased by about 12%.

Hence, the mark-ups established within the energy sector exert a pivotal influence on the aggregate mark-up.

Nevertheless, it is imperative to note that, despite these dynamics, the mark-up for overall economic activity remains subpar in comparison to its pre-pandemic benchmark. Furthermore, the temporal alignment suggests that the augmentation in mark-ups may have contributed to tempering the deceleration in inflation since the culmination of 2022, rather than serving as the primary catalyst for its precipitous ascent. In principle, an increase in the historic (purchase) cost of intermediate inputs (and possibly of fixed capital) larger than unit labor costs should increase the mark-up over unit variable costs even with a given nominal rate of return on (circulating) capital, since it would increase the numerator of the mark-up proportionally more than the denominator. The fact that an increase in the mark-ups above the levels experienced before the pandemic can be detected only in agriculture and energy might suggest that not only wages but also profits in some industries have experienced some losses due to the changes in terms of trade, albeit these have been distributed to a larger extent to workers than firms. To improve our understanding, we proceed with other measures of profitability.

[FIGURE 8 HERE]

Figure 9 provides further empirical evidence. We have computed an ex-post actual rate of profit[8] by calculating the ratio of the Gross Operating Surplus (which includes gross mixed incomes exceeding average employee compensation)[9] to the value of net capital stock evaluated at the prevailing price of substitution. Across all the sectors examined, there has been a substantial stagnation in this actual rate of profit since 2009. However, a noteworthy exception emerges in the Energy and Construction sectors, where the upsurge started well before the inflationary upsurge in 2015. Furthermore, while an acceleration in the energy distribution sector was conspicuous between 2018 and 2019, with growth continuing into 2020 but at a slower pace, the upsurge witnessed in the construction sector in 2020 can be largely attributed to specific government measures aimed at bolstering the sector, which in turn led to a substantial surge in demand.

[FIGURE 9 HERE]

Regrettably, data for the Energy distribution sector is unavailable for the years 2021 and 2022. Indirect evidence can be gathered by looking at the steep increase in industry, which includes energy,

[8] For some considerations related to this measure, see the work of Levrero and Stirati (2005). They provide valuable insights and caveats that should be taken into account when interpreting and analyzing this particular measure of profit.
[9] We obtain a time series for Gros Operating Suplus by deducting the sectoral wage bill to the nominal value added. Following the methodology used to construct the Adjusted wage share, the wage bill is calculated by applying the average wage of employees to the self-employed.

in the last two years, *vis à vis* the substantial stability, on average, in manufacturing and in the private sector as a whole.

Figure 10 shows the path of the ex-post rate of profits once circulating capital and capital depreciation are considered.[10] As is possible to observe, with respect to Figure 10, some modifications in the pattern of the ex-post actual rate of profit emerge, although no significant changes in its overall dynamics. The rate of profit for the entire economic activity exhibits an increase from 11.9% in 2020 to 13.7% in 2022. Unfortunately, also in this case data are not available for the energy sector, but it is plausible that the increase in the rate of profit of the Total activity is associated with economic recovery and with the rise in profit levels in the energy sector. Indeed, when we examine the construction and manufacturing sectors, we observe a slight reduction in the rate of profits, while the industrial sector, excluding construction but including energy, indicates a significant upswing.

[FIGURE 10 HERE]

So far, the data suggest that while an increase in profits and margins is taking place in the energy sector and to a lesser extent in agriculture and perhaps (with mixed evidence) in the constructions, in all other sectors there are no indications of an increase in profitability, which appears to be stagnant or even declining in real terms.[11]

5.5 Simple calculations based on price equations

Back of the envelope calculations based on Italian data[12] and equations 4) and 5) in section 4 above seem to fit well actual trends. Intermediate import (no energy) prices have peaked in the 4th semester of 2021 with a 22% increase *vis à vis* the first semester of 2021, then they have fluctuated around that level, thus contributing to inflation on impact - taking into account the weight of imported

[10] We approximate the circulating capital by estimating it as the difference between the value of production and the value added. Following the approach outlined by Levrero and Stirati (2005), we calculate the ex-post rate of profit using the following formula: $r = (Qk - Dep/Y)/[(Kf + Kc)/Y]$, where Qk represents the profit share (which, as mentioned earlier, is 1 minus the Adjusted wage share), Dep denotes capital depreciation at a current price of substitution, Kf represents the value of net capital stock at a current price of substitution, Kc is the estimated value of circulating capital, and Y represents the nominal value of production.

[11] In almost all cases profits and profit share are below the 1995 levels; however, the decline in the profit share 2000 - 2008 is at least in part due to a decline in productivity that appears to be the consequence of statistical/ accounting artifacts related to the emersion of irregular employment in the early 2000 and to the growth of low-income self-employment favored by changes in legislation in those years (see Paternesi Meloni and Stirati, forthcoming)

[12] The data source for this information is ISTAT, obtained from the National Accounts and International Trade and import price dataset. Moreover, data related to imported energy is derived from the Input-Output tables provided by ISTAT. In the exercise we assume a 1% pure remuneration of capital (the rate of return on long-term Italian bonds in 2021) and *completely abstract from profits of enterprise*. Of course, the latter are also proportional to capital and hence their consideration would increase the weight and impact of the increases in costs that we consider in the text. All weights of labor, import etc costs in total production refer to the year 2019.

intermediate inputs relative to total production (4% in 2019) – equal to 0.9%, and overall cumulated effect of 1.7%. (with α equal to 0,49). During 2022 the price of gas on the Dutch market has been on average 5 times higher than its price before the pandemic (Cucignatto and Garbellini, 2023, p. 4), with a peak of a more than tenfold increase in the summer of that year. Since many prices, including domestic consumer prices of energy and electricity, are linked to that market, we consider, following those authors, a first scenario with such an increase. Given the weight in total production of imported intermediate energy inputs (0.009 %) this should have contributed on impact to 4.4 percent points inflation, while its overall effect is 8.6%; if we add the nominal wage change of 2% over 2022, given the weight of wage costs on total production (15%), and assuming constant productivity,[13] the labor cost contribution to price increase would be 0,3 percent points on impact and 0.6 overall. Thus, we reach a predicted 11% total increase in GDP deflator after the whole impact of cost increases has worked out. In the alternative scenario in which we assume a threefold increase in imported energy prices, in line with average *actual* imported energy costs in 2022 (see Figure 4) the overall impact on inflation of all cost components would be 9%. The GDP deflator has changed from 110 to 120 between 2021-IV and 2023-I with an increase of 9%. Thus, inflation, measured by the GDP deflator, is in line with what would be predicted by our equations considering the actual increase in imported energy prices and assuming no changes in the nominal pure remuneration capital. The results of these simple calculations appear to be consistent with what emerged from the previous paragraph: an increase in profits in the energy sector, while in the other sectors *real* profitability, that is, taking into account the (in large part transitory) increase in the replacement costs of capital, may have been eroded. In consideration of our simplifying assumptions, and in particular the abstraction from profits of enterprises (see footnote 11), it is likely to be the case that the propagation process from increases in costs has not entirely worked out. However, in the light of the transitory nature of much of the shock in energy prices, it needs not ever fully develop – some of the losses for firms would be windfall losses.

6. Econometric analysis of the inflation propagation process

6.1 Methodology

This section aims to estimate the effect of a shock to the price of intermediate imported goods on inflation and on profits share in order to shed a light on the price and distributive effect of imported shock, without considering evolution in the mark-up. We apply the Local Projections method (Jordà,

[13] Productivity has actually declined somewhat, but this should be attributed to cyclical factors, that normally do not affect price formation.

2005) to a time series of quarterly data from Q1-2005 to Q1-2023.[14] All our variables are at log level except for interest rate. Details on sources and definitions are reported in the Appendix.

Note that the price of imported intermediate goods refers to the industry sector, excluding constructions, while all the other variables refer to the Total activity. This represents a conservative hypothesis for us because we observe the behavior of a sectoral shock on total activity. The Local Projections (LPs) approach entails the estimation of individual single regressions in which the variable of interest is considered in each horizon following the realization of the shock. LPs have recently found utility in evaluating medium-term effects of macroeconomic shocks, as evident in the works of Auerbach and Gorodnichenko 2012; Deleidi et al. 2023; Girardi et al. 2020; Paternesi Meloni et al. 2022.

In this methodology, IRFs are generated using β coefficients obtained from regressions conducted over different time horizons (h). In practical terms, we perform regressions for the variable of interest at each period (t + h), taking the shocked variable at time t into account. This approach allows us to compute the average response of the dependent variable following the shock after h periods have passed. Essentially, β coefficients indicate the impact in year t + h resulting from an episode of innovation in the price of the imported intermediated goods that occurred at time t. Each coefficient is plotted through our IRFs. Therefore, we estimate the equation 5.1:

$$y_{t+h} = \beta^h S_t + \sum_{j=1}^{p} \psi_j^h y_{t-j} + \sum_{j=1}^{p} \xi_j^h PIMP_{t-j} + \sum_{j=1}^{p} \varrho_j^h X_{t-j} + d_{20211} + \varepsilon_{t+h} \qquad [5.1]$$

Were t index represents time; h the time horizon; j the lagged period of time. Δy_{t+h} is the level of the price index (HICP) or the level of Profit share (PS)[15] between $t-1$ and $t+h$; S_t is the shock to the price of imported intermediate goods. We also consider the lagged value of both dependent variables (y_{t-j}) and the lagged value of the price of imported intermediate goods ($PIMP_{t-j}$). In addition, the vector X_{t-j} refers to the lagged value of hourly nominal wage, short-run interest rate, and the mark-up of Total Industry (excluding constrictions). We add these two control variables, to consider them only before the shock is happened. d_{2021} is a dummy variable assuming a value equal to 1 in the first quarter of 2021, when the inflation upsurge started, and 0 otherwise.

However, the initial step involves identifying an exogenous shock to the price of the imported intermediate goods (S_t). To achieve this, we employ a recursive identification strategy within a VAR

[14] According to the different authors (Auerbach and Gorodonichenko (2017); Plagborg-Møller and Wolf (2021)) the LP approach represents an alternative to VAR models to obtain the impulse response functions (IRFs). Furthermore, Jordà (2005) highlights that LPs have various advantages because they are robust to different sources of misspecifications.

[15] In contrast to the previous section, the Profit Share data used in this analysis is based on quarterly intervals rather than yearly data. To derive this quarterly data, we had to rely on value added at market prices since factor price information is not accessible at the quarterly level.

model. In this VAR model, the level of price of imported intermediate goods ($PIMP$) is ordered first, as it is considered the most exogenous variable, while the second variable ordered is the level of the internal price ($HICP$). The final ordered variable is the profit share (PS). In this context, Equation (5.2) represents the first equation of a Structural-Vector Autoregressive model (S-VAR). This S-VAR model is instrumental in deriving the exogenous shock to the price of imported intermediate goods (S_t), represented as the residual (ε_t^{PIMP}).

$$PIMP_t = \alpha_j PIMP_{t-j} + \vartheta_j HICP_{t-j} + \tau_j PS_{t-j} + \varepsilon_t^{PIMP} \quad [5.2]$$

6.2 Impulse response functions

In this section we present our findings through Impulse Response Functions (IRFs). Figure 11 depicts the IRFs of our model, illustrating the effect of a shock to $PIMP$ on the evolution of internal price ($HICP$) and of profit share (PS) over a time span of 16 quarters (equivalent to 4 years). These graphs reveal that, upon impact, the price of imported intermediate goods undergoes a 1% increase. However, its trajectory evolves over time, gradually dissipating after 6 quarters. In contrast, the impact on the overall price level is less pronounced (0.5%) but highly persistent, remaining significant for up to 9 quarters, which is nearly one year beyond the initial shock.[16] Additionally, the profit share displays a positive trend starting from the 5th quarter and tends to persist at a higher level until the end of the period. This suggests that a shock to the price of imported intermediate goods can yield long-lasting effects on the price level. Furthermore, it indicates that, in the absence of changes in nominal wages, a shift in functional income distribution favoring capital owners can occur without necessitating adjustments to mark-up, which we consider a control variable. Finally, the pivotal role played by the price of intermediate imported goods in price increase is also confirmed by Bijnens et al. (2023) for Belgium.

[FIGURE 11 HERE]

6.3 Robustness check

At this stage, we enhance the robustness of our results through a two-step process. Firstly, we assess the impact of our shock on the HICP index, excluding energy, food, alcohol, and tobacco prices (hereafter HICP core), which is used to calculate core inflation. Then, we investigate the effects of

[16] Please be aware that the present model is linear. Therefore, the return to the initial price level results from the dissipation of the shock. In other words, we have observed that when import prices increase, internal prices also rise. However, in this model, the reverse holds true as well. It's important to emphasize that we have noticed a significant degree of persistence both in the shock and in the internal price response, with the latter displaying longer time-span of persistence over time and this latter is the finding that we want to underlie.

shocks to alternative variables related to imported prices, specifically energy prices and the overall price of imported goods. Finally, we propose a comprehensive structural model that takes into account both past and contemporaneous relationships for all the variables in our model, including the control variables. The Figures representing the Impulse Response Functions are reported in the Appendix.

6.3.1 The effect of an innovation in PIMP on HICP "core"

To corroborate our findings, we conducted tests by subjecting the same shock to PIMP to the HICP. For this purpose, equations 5.1 and 5.2 were modified, replacing the new price index (HICP core) with the old one (HICP). The baseline results – reported in Figure A1 - are reaffirmed, as we observe a positive and enduring effect of the shock. Interestingly, while the elasticity is lower compared to HICP (we find an elasticity of 0.2 at 6 quarters), the behavior of core inflation is noteworthy. The shock appears to propagate to this variable with a slight delay, approximately 2 quarters, but it persists for up to 10 quarters, which is 1 quarter longer than the effect on HICP.

6.3.2 Shock to the Imported Energy Price

At this point, we assess the impact of a shock to the price of imported energy (PIE), which is not included in the basket of goods used to calculate the index of imported intermediate goods, on HICP and PS (Figure A2). To do this, we replace PIMP with PIE in equations 5.1 and 5.2. Our baseline findings are validated. The shock to PIE exhibits less persistence compared to the effect on HICP, lagging by about 2 quarters. This indicates that an increase in imported energy prices has a more extended impact on the overall internal price level. Similar to previous results, the effect on functional distribution is significant with some delays, beginning at quarter 3 and lasting until quarter 11 also controlling for mark-up in the period before the shock.

6.3.3 Shock to the price of total imported goods

Next, we examine the impact of a shock to the price of total imported goods (PITOT), which encompasses both intermediate and consumer imported goods, on HICP and PS (Figure A3). To do this, we replace PIMP with PITOT in equations 5.1 and 5.2. Once again, our baseline findings are affirmed. The shock to PITOT demonstrates less persistence compared to the effect on HICP, lagging by approximately 3 quarters. This indicates that an upsurge in imported goods prices has a prolonged impact on the overall internal price level, which tends to remain significant even after the initial shock has dissipated. Similar to previous results, the effect on profit share is significant with some delays, commencing at quarter 3 and remaining highly persistent, and significant until the end of the period, even when controlling for mark-up in the period preceding the shock.

6.3.4 Cohomprensive model

To enhance the robustness of our results, we have expanded our baseline recursive identification strategy (equation 5.3) by incorporating the additional variables used as controls. This extension aims

to create a comprehensive model. Following a recursive approach, we have imposed restrictions on the matrix of contemporaneous relationships among variables, applying a standard Cholesky decomposition. This allows us to establish an ordering of variables from the most exogenous to the least, considering both theoretical relevance and data quality Kilian and Lütkepohl (2017). Therefore, we run equation 5.3.

$$PIMP_t = \alpha_j PIMP_{t-j} + \vartheta_j HICP_{t-j} + \theta_j i_{t-j} + \theta_j w_{t-j} + \rho_j \mu_{t-j} + \tau_j PS_{t-j} + \varepsilon_t^{PIMP} \quad [5.3]$$

While $PIMP$ and $HICP$ remain as the first-ordered variables, we have designated the short-run interest rate (i) as the third variable, reflecting the "typical" response of the central bank to combat inflationary surge. The nominal wage (w) is the fourth ordered variable in our sequence, a choice based on empirical observations indicating that negotiated nominal wages respond to changes in consumer prices with a certain delay, due to the wage formation mechanism and its evolution in the last decades in Italy (Gaddi, 2023a; 2023b). The firms' mark-up is our fifth variable in the order, as it is inherently influenced by both output prices and input costs. Lastly, PS is the last variable in our sequence. Figure A4 displays the IRFs of this model. As it's possible to note, the results are consistent with our baseline model. An innovation in the price of imported intermediate goods produces a significant and relatively more persistent increase in the overall internal price index. The impact on Profit Share, and consequently on the functional income distribution, exhibits a delayed onset, similar to our baseline model, and becomes significant between the 6th and 11th quarters. This occurs without any significant innovation in the mark-up and is likely the result of the reduction in real wages. This conclusion is drawn from the relatively higher increase in HICP compared to the nominal wages, which display a lower and relatively stagnant trajectory.

7. Conclusions and policy implications

We described different views concerning cost-push and conflict inflation and the interpretation of current inflation. Many studies discard the role of excess demand or excess liquidity at the origin of current inflation in the US. Such a role is most unlikely in the Eurozone, where fiscal stimulus has been less important and nominal wage dynamics have been very moderate on average. Several scholars have instead argued for, and empirically supported, a profit-driven inflation made possible by the initial push deriving from imported inputs, mostly energy inputs, and some supply disruptions, which provided an opportunity for price increases that went far beyond the increases in costs. This would represent a peculiar, one-sided form of conflicting-claims inflation, in which owing to the difficulty of nominal wages to keep-up with inflation, firms would be able to reap higher profits. In a way, it is ironic that the notion of conflict inflation is gaining increasing consensus at an analytical

level (e.g. Lorenzoni et al. 2023) at a time when actual inflation seems very little conflict-driven, at least as far as wage claims are concerned.

We have looked at Italian data as a case study for current inflation. The evidence we have analyzed suggests that there has not been, for the moment, a generalized *increase* in profitability and mark-ups on variable costs, *with the notable exception of the sector of energy distribution* (distribution of gas, and electricity). In the latter case, it is likely that a major role was played by the way in which prices are regulated, particularly their link to the gas prices established on the Dutch gas market. Actually, the price of gas for domestic customers (both firms and households) has been perfectly aligned with the TTF (Confindustria, 2023), where futures contracts on gas are predominantly traded. This exposes the market to speculation, as the price is influenced not solely by the actual demand and supply of gas, but also by expectations on future price trends. Since, in addition, purely financial actors are allowed to operate in that market, such expectations are likely to cause large and short-lived speculative bubbles. This may cause a higher volatility of prices than is justified by actual market conditions. Furthermore, the price of energy on the wholesale european market is determined based on the System Marginal Price. When setting the price of energy, the source from which it was produced (whether renewable, gas, coal, or nuclear) is not taken into account. Instead, at the end of the auction, all intermediaries will pay the marginal price, which is the last price accepted, typically the highest among the offered prices.

Thus, the increase in 'core inflation' so far seems to reflect propagation mechanisms of inflation that depend on intrafirm exchanges and the price increases of domestically produced intermediate goods. Nominal wage growth up to now has been much below inflation and almost in line with the ECB target inflation rate of 2%, thus causing a very large decline in real wages.

As noted in Hansen et al. (2023) it is very difficult to have fully appropriate measures of profitability. We use several indicators, ex-post profit rates among them. Evidence indicates that in domestic industries excluding energy firms, on average profitability has remained unchanged or has been eroded, though the losses from the terms of trade worsening have clearly impacted wages to a much greater extent.

Our econometric findings align closely with this body of evidence. In fact, we have observed that the consumer price index exhibits a relatively persistent response to shocks in the prices of imported intermediate goods and energy. Furthermore, this leads to a deterioration in income distribution due to the limited or absent reaction in nominal wages and no evidence of modification in the mark-up.

In the near future, this situation may then give rise to further propagation mechanisms deriving from the attempt of wage earners to adjust their real incomes. It is however unlikely that the adjustment will be complete: the average wage pass-through of inflation has generally been less than one,

historically, and of about one-third in the 1985-2018 period (Paternesi Meloni and Stirati, 2018). In the case of Italy however substantial wage recovery is to be *hoped for* since real wages are already extremely low. Even in a scenario in which all parties are attempting to recover previous real incomes, the decreasing cost-push pressure from imported inputs, along with some increases in productivity, should bring about a smooth decline in the inflation rate.

In such circumstances, monetary and fiscal tightening aimed at creating unemployment and thus keeping in check nominal wages would turn-out to be extremely disruptive for Italy and most Eurozone countries. Some price controls and compensations for low incomes aiming at avoiding price-price and price-wage spiraling as a consequence of a largely *transitory* cost push seem more likely to be able to counter inflation and prevent social and economic damage. In addition to its negative impact on aggregate demand and financial stability (for example owing to increases in households' payments for interests on mortgages, or to the impact on the market value of public bonds held by banks), monetary policy can make inflation worse by rising the benchmark return on capital – the so-called cost-channel of monetary policy (Cucciniello et al. 2022) for a discussion and empirical evidence). Accordingly, it is extremely important to look for alternative tools to contain an inflationary process that appears largely triggered by the volatility of energy (and food) prices. The current surge of inflation should lead to a general reconsideration of the rules concerning domestic energy price-fixing in Italy, as well as the regulation of the Dutch gas market in Europe. Concerning the latter, should access to it be reserved to actors that materially trade gas, with the exclusion, that is, of merely financial operators, the volatility of prices might be contained. Concerning the domestic price of energy, the large increases in the profit share and the indirect evidence of increases in the mark-up and ex-post profit rates in the domestic energy distribution industry, suggest that there was and probably there still is scope for a *carefully designed policy of capping domestic energy prices*, a policy that has proven successful in Spain. The ability to keep energy (and food) prices under control during a period of high volatility, thus avoiding cumulative price rises and wage adjustments, would be extremely important for the Italian economy, since it is, on the one hand, structurally very exposed to the impact of energy prices and, on the other hand, a higher inflation than in trade partners would exacerbate a pre-existing problem of real exchange rate overvaluation for manufacturing products, with its negative impact on net exports. A particularly serious problem, considering that exports are the only autonomous component of aggregate demand that could possibly drive GDP growth, given the constraints on public spending and the impact of inflation and interest rates on consumption and credit. At the same time, high inflation significantly worsens an already existing problem of low wages and in-work poverty, with consequences for social stability and domestic demand.

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APPENDIX

***Table A 1**. Data sources and definition*

Data	Description and sources
Compensation per hour worked	Gross nominal compensation per hour worked. Quarterly and annual data. Source: ISTAT, Quarterly national accounts
HICP	Hamonized index of consumer price by COICOP 2018, Monthly data and Quarterly average. Source: ISTAT
Import Price index	Import price index measures the evolution of prices for industrial products bought by industrial and commercial enterprises in Italy, by COICOP 208 and by NACE rev 2. Monthly data and Quarterly average. Source: ISTAT
Interest rate	Short-term interest rate. Quarterly data. Source OECD Economic Outlook No 110
Mark-up	Ratio between output deflator and unit variable costs (intermediate goods and labour). Quarterly data. Source: ISTAT, Quarterly national accounts
Producer Price Index	Industrial producer price index measures the evolution of output prices for goods manufactured in Italy and sold on the domestic markets, by COICOP 2018 and by NACE rev 2. Monthly data and Quarterly average. Source: ISTAT
Profit Share	Ones' complement of Adjusted wage share. Source: ISTAT, National accounts. Authors' calculation.
Wage Share, adjusted	Nominal compensation per employees on Gross Value added per person employed. Annual and quarterly data. Source: ISTAT, National accounts . Authors' calculation

***Figure A 1**. Impulse Response Functions. Response of HICP core to an innovation in PIMP. 2005Q1-2023Q2*

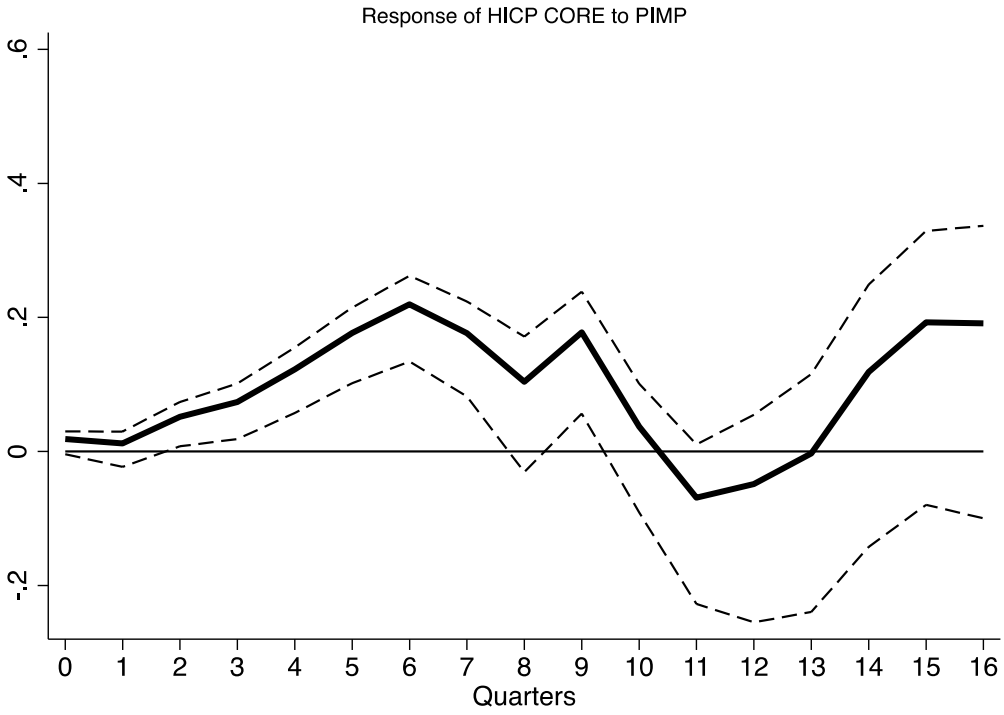


***Figure A 2**. Impulse Response Functions. Response of HICP and PS to an innovation in the price of imported energy. 2005Q1-2023Q2*

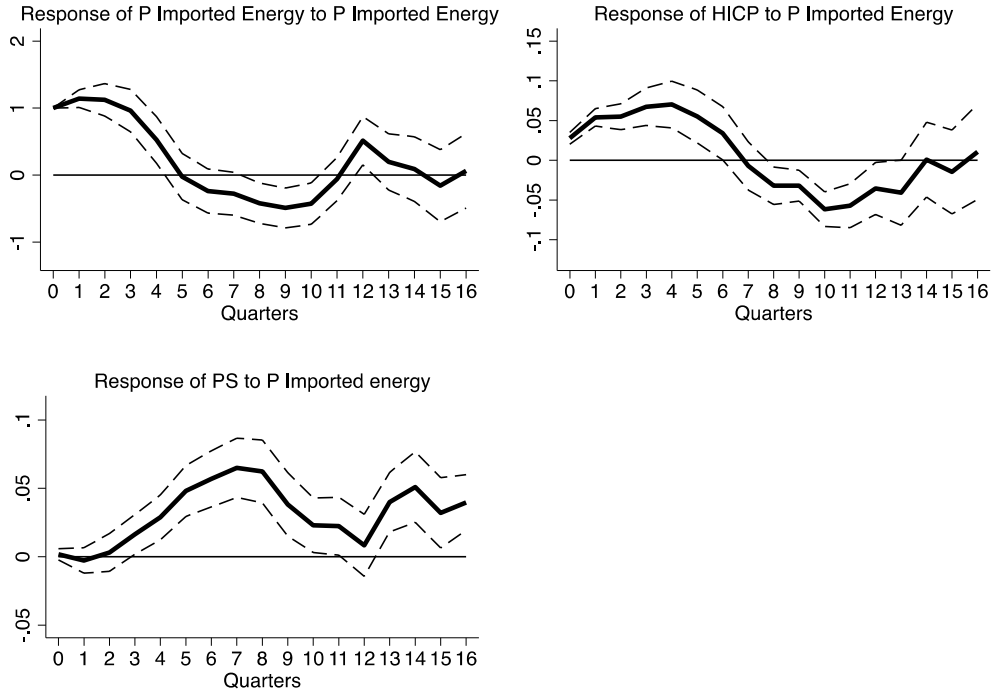


***Figure A 3**. Impulse Response Functions. Response of HICP and PS to an innovation in the price of imported goods. 2005Q1-2023Q2*

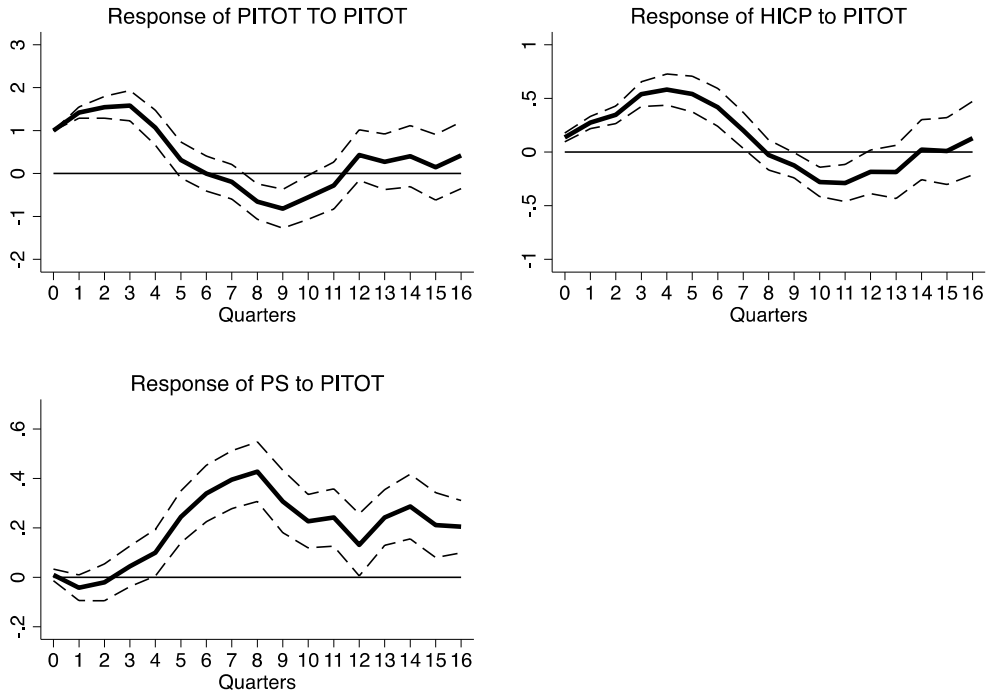


***Figure A 4.** Impulse Response Functions. Cohomprensive model. Equation 5.3. 2005Q1-2023Q2*

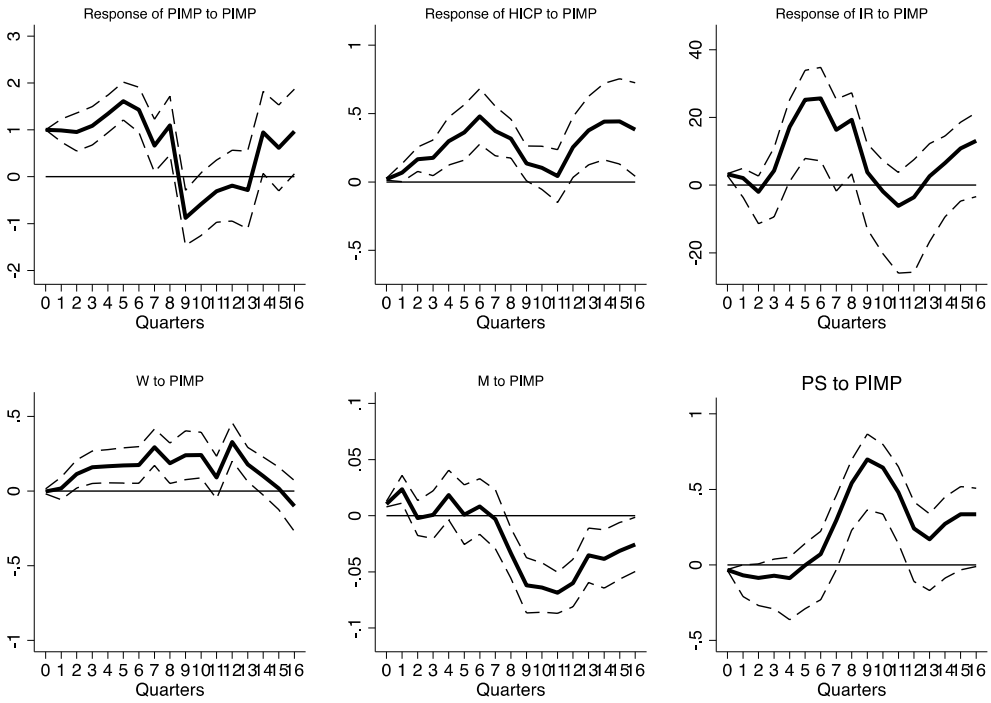


Figure 1. *Harmonized index of consumer prices. Percentage change with refer to the same period of the previous year. Source: ISTAT*

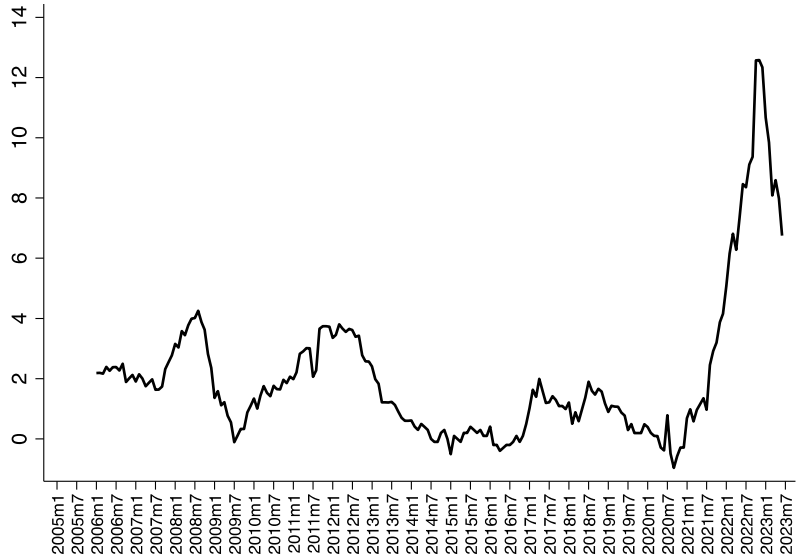


Figure 2. *Harmonized index of consumer prices, of energy goods and of "core" goods, Source: ISTAT. Base year 2018M1*

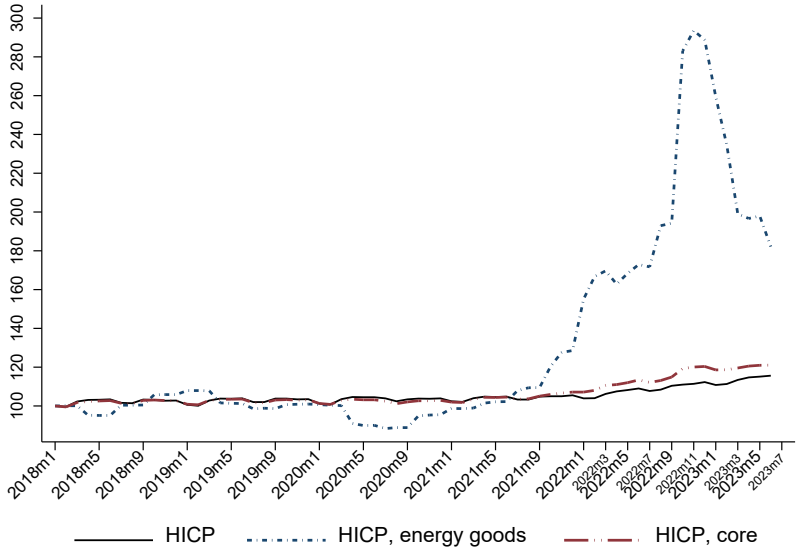


***Figure 3**. Industrial producer prices for the internal market, by COICOP 2018 classification (left graph) and by economic sector (NACE rev 2, right graph). Source: ISTAT Base year 12- 2019*

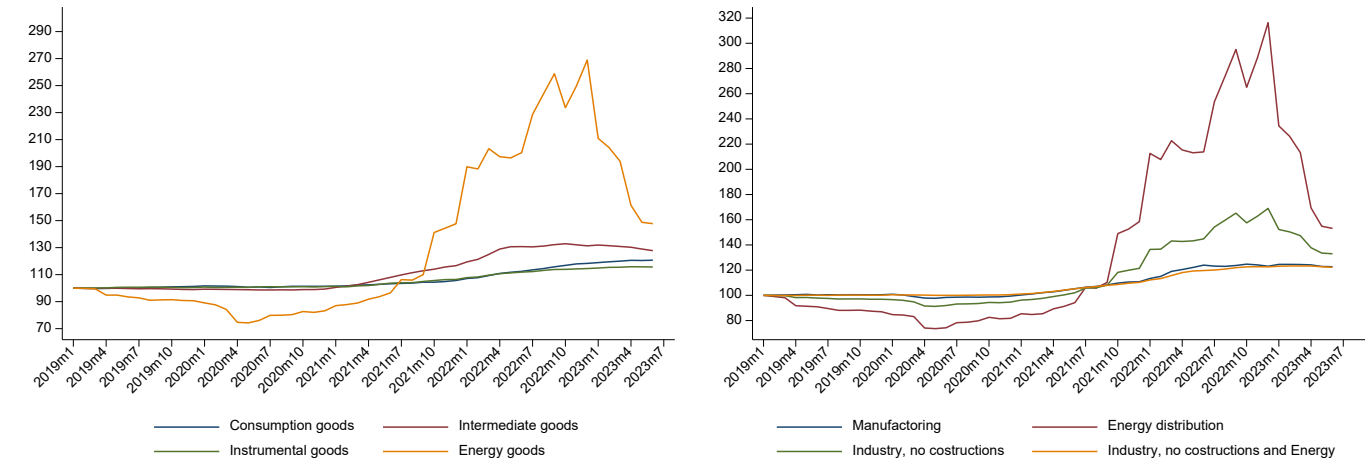


***Figure 4**. Import prices, COICOP 2018 classification. Source: ISTAT, Base year 1-2005*

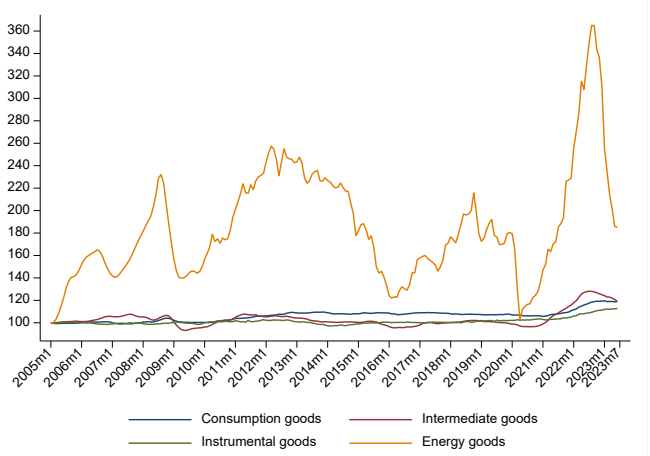


***Figure 5.** Nominal compensation per hour worked (left graph); real compensation per hour worked (right graph), base year 2018. Source: ISTAT*

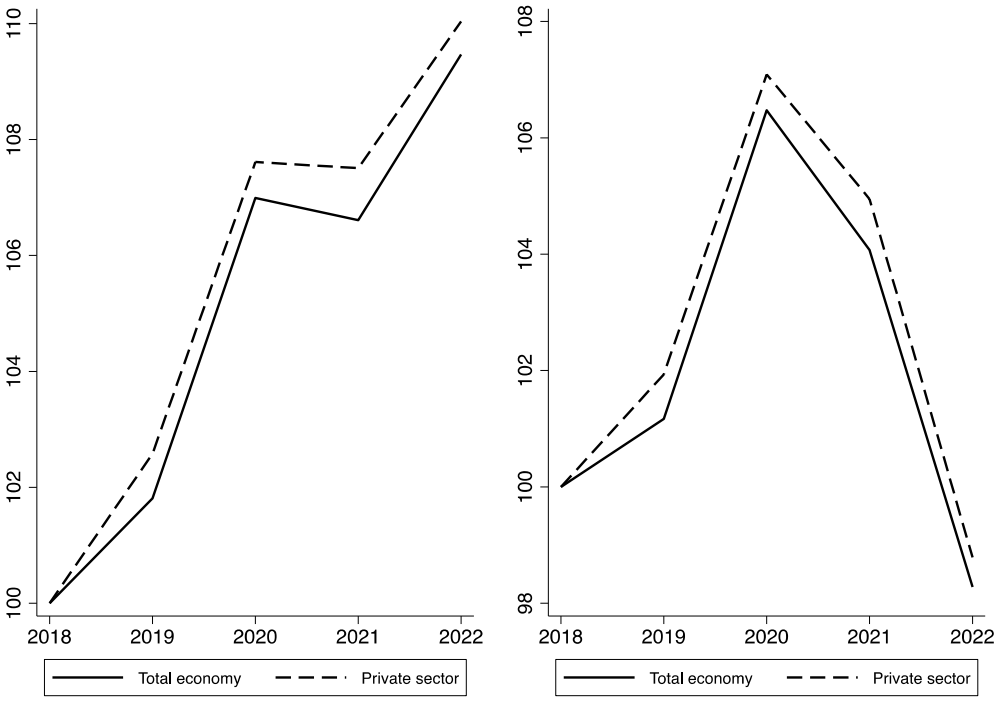
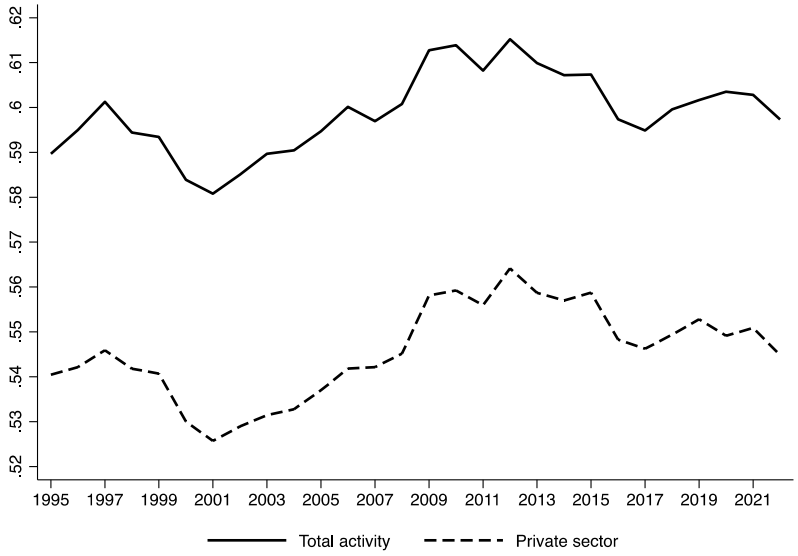


***Figure 6**. Adjusted wage share by sectors (NACE rev 2). Authors' own calculation based on ISTAT data.*



Note: Private sector refers to the difference between Total economic activity and public administration and defense; compulsory social security (O 84) sector

Figure 7. *Profit share. One's complement of the Adjusted wage share. Author's own calculation based on ISTAT data.*

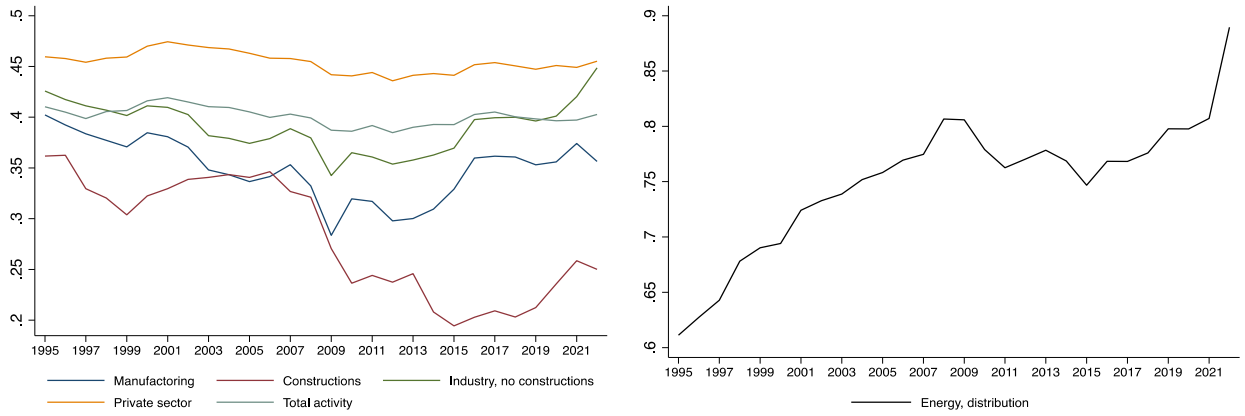


Figure 8. *Firm's mark-up by sectors. (NACE rev 2). Source: ISTAT*

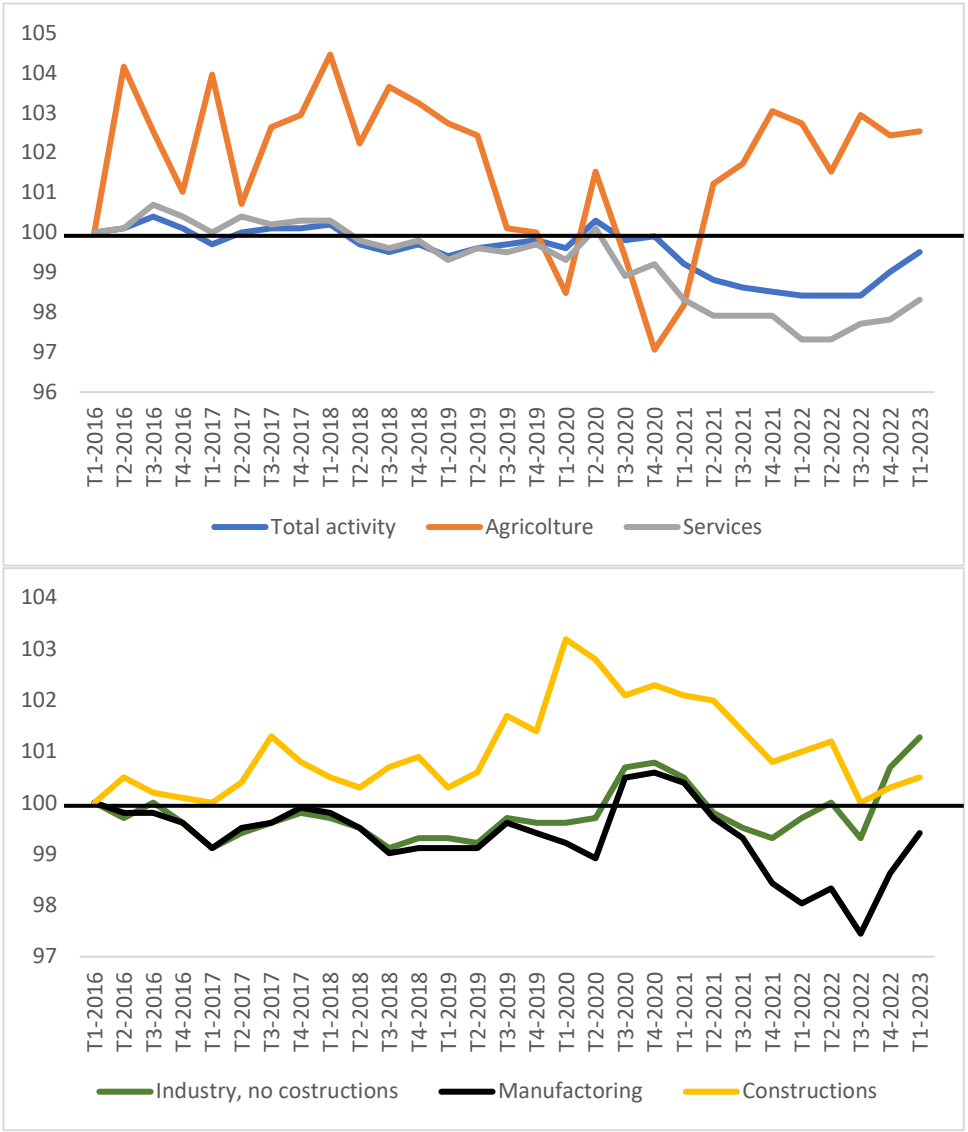


Figure 9. *Ex-post rate of profits as GOS on net capital stock at current price of substitution, by sectors (NACE rev 2). Authors' own calculation based on ISTAT data.*

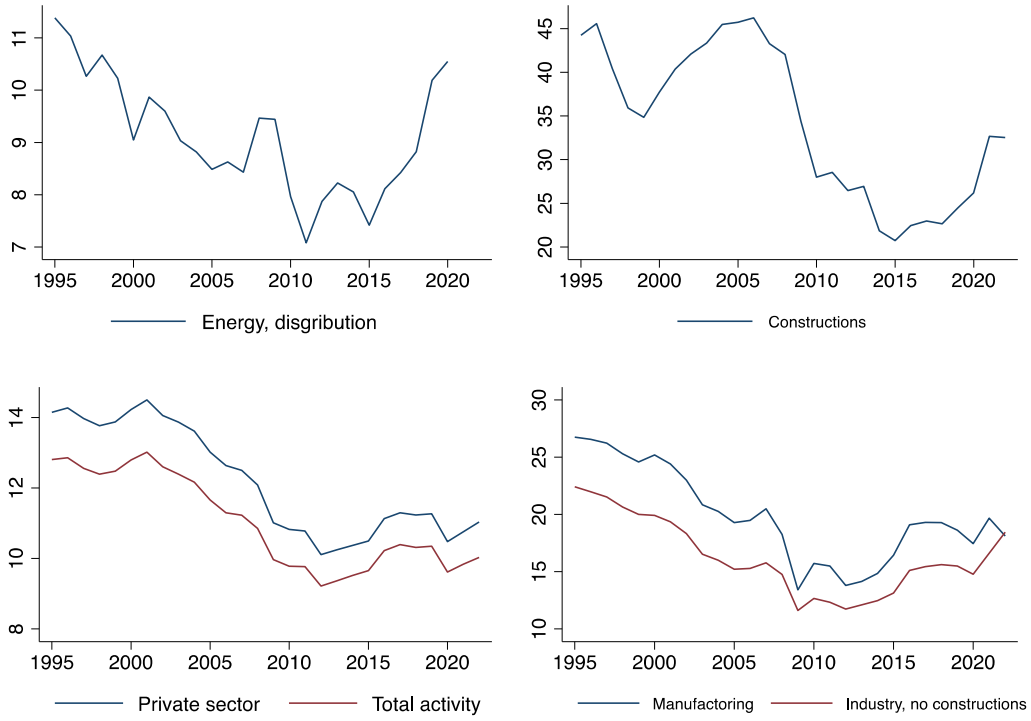


Figure 10. *Ex-post rate of profits considering circulating capital and depreciation of capital, by sectors (NACE rev 2). Authors' own calculation based on ISTAT data.*

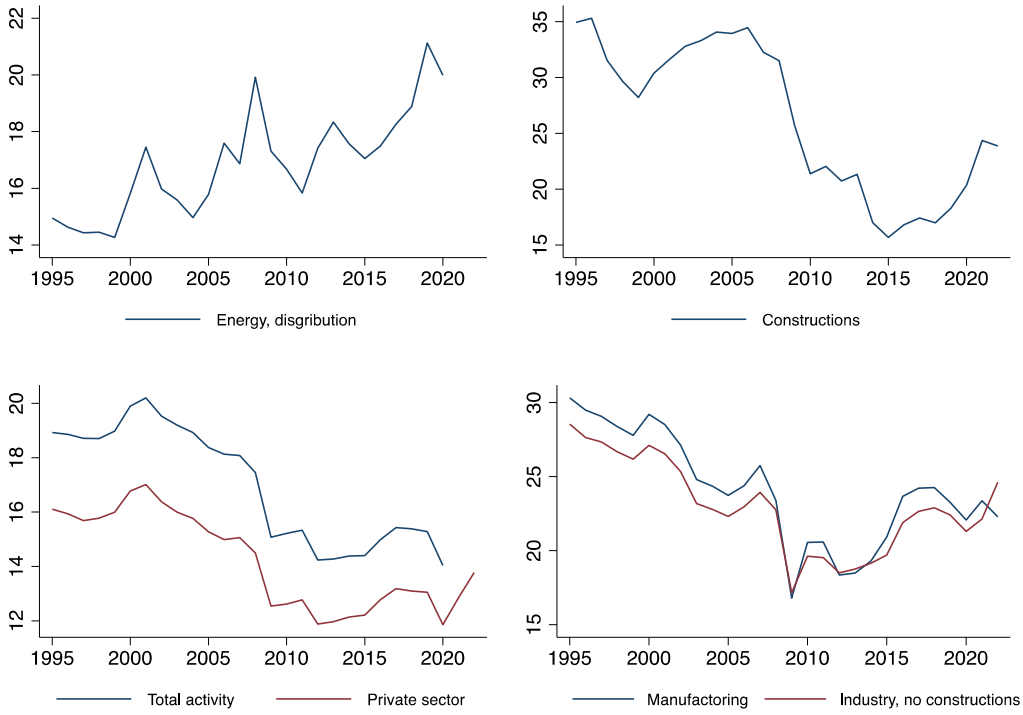
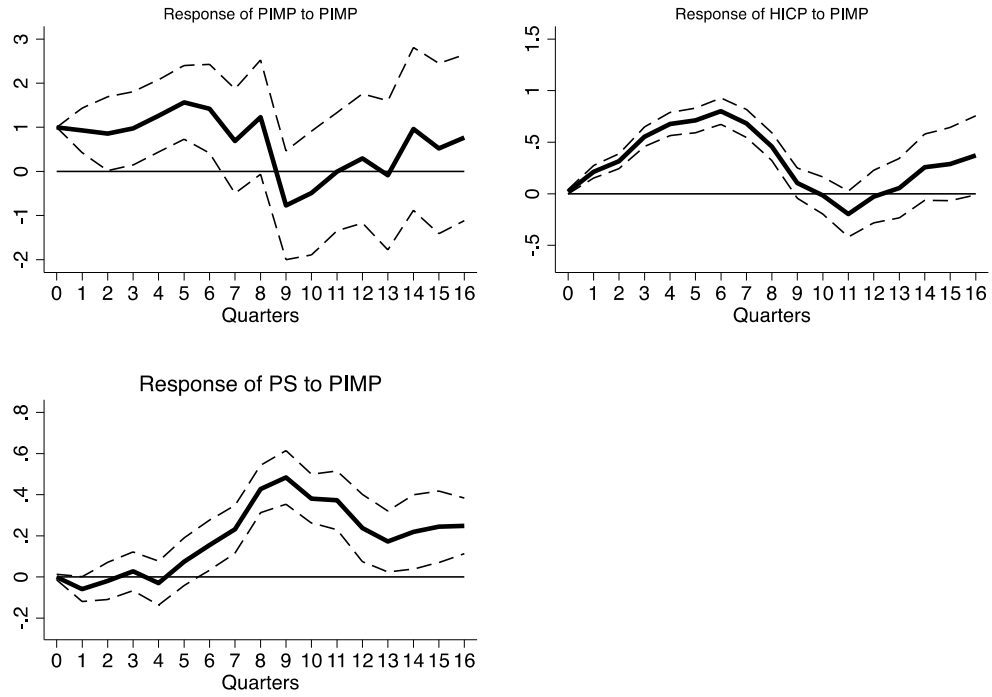


Figure 11*. Impulse response function, equation 5.1. 2005Q1 – 2023Q2. Dotted lines denote 68% confidence bands.*



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