BANCA D'ITALIA

EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

What caused the post-pandemic inflation in Italy? An application of Bernanke and Blanchard (2023)

by Massimiliano Pisani and Alex Tagliabracci

June 2024

Number 851

BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

What caused the post-pandemic inflation in Italy? An application of Bernanke and Blanchard (2023)

by Massimiliano Pisani and Alex Tagliabracci

Number 851 – June 2024

The series Occasional Papers *presents studies and documents on issues pertaining to the institutional tasks of the Bank of Italy and the Eurosystem. The* Occasional Papers *appear alongside the* Working Papers *series which are specifically aimed at providing original contributions to economic research.*

The Occasional Papers *include studies conducted within the Bank of Italy, sometimes in cooperation with the Eurosystem or other institutions. The views expressed in the studies are those of the authors and do not involve the responsibility of the institutions to which they belong.*

The series is available online at www.bancaditalia.it .

ISSN 1972-6643 (online)

Designed by the Printing and Publishing Division of the Bank of Italy

WHAT CAUSED THE POST-PANDEMIC INFLATION IN ITALY? AN APPLICATION OF BERNANKE AND BLANCHARD (2023)

by Massimiliano Pisani* and Alex Tagliabracci*

Abstract

We estimate using Italian data the model proposed by Bernanke and Blanchard (2023) to explain the dynamics of prices and wages in the post-pandemic period in Italy. The empirical analysis shows that the model performs well in capturing inflation developments, which were mainly driven by the energy and food components, but the fit of the wage dynamics is not entirely satisfactory as the specific features of the Italian labor market are not adequately described by the econometric specification considered.

JEL Classification: C5, E3, J3.

Keywords: inflation, wages, inflation expectations, energy, COVID-19.

DOI: 10.32057/0.QEF.2024.0851

* Bank of Italy, Directorate General for Economics, Statistics and Research.

1. Introduction[1]

As in other major industrialized countries, after many years of low and relatively stable values, Italian consumer price inflation became more volatile and recorded historically high rates in the aftermath of the COVID-19 pandemic and, in particular, with the international energy crisis.[1] Inflation was slightly negative on average in 2020, turned positive in 2021 and peaked at 12.6 per cent in November 2022, the highest level since the mid-1980s. Afterwards, inflation starts to decline, falling below 1 per cent one year later.[2]

Given the international dimension of the pandemic shock and of the geopolitical shock associated with Russia's invasion of Ukraine,[3] the potential drivers of post-pandemic inflation are broadly common across the major industrial countries. This list includes sharp increases in international energy and food prices, disruptions in supply chains, attempts by firms to increase mark-ups over costs, increases in short- and long-term inflation expectations, tight labor markets and real wage rigidities.

In this paper, we focus on the Italian economy and evaluate the role of these drivers by estimating the model proposed by Bernanke and Blanchard (2023) (hereafter BB). The estimation using Italian data is part of a larger project, involving the world's main central banks, aimed at comparing the results obtained by estimating the same model (BB) using national data from several countries. Therefore, for the sake of comparability of the results, we take the off-the-shelf BB model and estimate it without any major modification. The theoretical core of the model consists of four equations: one for wages, one for consumer prices and two for inflation expectations (short-run and long-run respectively). In

[1] We are grateful to Ben Bernanke and Olivier Blanchard, as well as to Sam Boocker, Denise Dowden and Dilek Sevinc, for sharing codes, for piloting the cross-country common exercise and for useful suggestions and comments. Without implications, we would like to thank Gaetano Basso, Fabio Busetti, Michele Caivano, Emanuele Ciani, Domenico Depalo, Salvatore Lo Bello, Fabrizio Venditti and Giordano Zevi for useful inputs and comments at different stages of this work. All the remaining errors are ours alone. *The views expressed here are of the authors' only and should not be interpreted as representing the views of the Bank of Italy or of the Eurosystem.*

[2] Ciccarelli and Mojon (2010) suggest that, historically, inflation in industrialized countries is largely a global phenomenon. In particular, inflations of 22 OECD countries have a common factor that accounts for nearly 70% of their variance. This co-movement is due not only to the trend components of inflation (up from 1960 to 1980 and down thereafter) but also to fluctuations at business cycle frequencies.

[3] Ropele and Tagliabracci (2024) use Italian survey data to study the effects of the Russian invasion of Ukraine on firms' expectations and document that the conflict led firms to revise upward their inflation expectations and their own expected prices changes and made them more pessimistic about the general macroeconomic outlook and their business conditions.

particular, the nominal wage growth depends on a catch-up component[4] and on a term related to labor market tightness. Consumer price inflation depends on the nominal wage growth and on variables that proxy commodity prices and supply shortages.[5] Short-run inflation expectations depend on their own lags, on long-run expectations, and on lagged actual inflation, while long-run inflation expectations depend on their own lags and on lagged actual inflation. The model is estimated using quarterly data for the Italian economy over the period 1999Q1-2023Q2.

Our main results are the following. First, the model fits consumer price dynamics quite well, while the fit for wages is not entirely satisfactory. Second, energy, food and, to a much lesser extent, supply shortages shocks explain Italian consumer price inflation in the post-COVID period. However, their effects turn out to be short-lived. Third, labor market tightness plays a rather limited role in explaining the fluctuations of headline inflation. Fourth, wage growth is mainly explained by initial conditions (i.e. by the contribution of pre-2020 data rather than the shocks considered which occurred after 2020) and together with the poor fit suggest that the model is not able to fully capture the main features of the Italian labor market.[6] As suggested by Bernanke and Blanchard (2024) for the case of the major industrial countries, the evidence for Italy confirms that, contrary to the what happened in the 1970s, the mechanism that could have triggered a wage-price spiral (an initial supply shock that raises prices, propagates through wages and becomes entrenched in inflation expectations) was not at play in this inflation episode.[7] The increases in inflation due to the commodity price shocks were large, but also relatively short-lived.

This paper relates to the literature on inflation dynamics in Italy and in the euro area during the post-pandemic period. Arce et al. (2024) estimate the BB model using euro-area data and they find

---

[4] Workers "catch-up" by inducing employers to compensate them retroactively for the loss in real wages due to unexpected inflation. In this case, one might have expected further increases in nominal wages and, by implication, in prices.

[5] For the sake of brevity, we do not report all the details of the four equations here and we refer the reader to the original paper for full details.

[6] Bulligan et al. (2021) show that in the euro area in the pre-COVID period the level of long-term inflation expectations registered two significant declines in 2013 and 2019, moving away from the ECB's inflation aim and provide empirical evidence that the decrease in inflation expectations was associated with a progressive reduction in the long-term expectations of real GDP growth. Bottone et al. (2022) use Italian survey data to provide empirical evidence on how the ECB's inflation target affects the formation mechanism of firms' inflation expectations at different horizons. Corsello et al. (2021) and Neri et al. (2022) present several analyses of the degree of anchoring of inflation expectations at the euro area level.

[7] Corsello et al. (2023) examine the oil-price shocks that impacted the global economy in the 1970s, leading to high inflation that proved to be considerably long-lasting in some advanced countries and investigate the possible reasons for the failure of monetary policy to contain prices at that time.

that euro area inflation since 2021 has been driven by both supply and demand factors, with the former playing a primary role.[8] Supply-side shocks were mostly related to energy and food price shocks, partly due to the invasion of Ukraine by Russia. Moreover, they do not find strong evidence so far that labor market overheating, as measured by the job vacancies to unemployment ratio, has significantly impacted wage growth and price inflation in the euro area.[9]

Using various empirical models (including VAR models, time-varying Phillips curves and dynamic factor models), Neri et al. (2023) find that in the case of the euro area the contribution of energy shocks to headline inflation is estimated to be around 60 per cent in the fourth quarter of 2022, while that to core inflation is between 20 and 50 per cent, depending on the model. They also find evidence of an increase in the pass-through of energy prices to core inflation following the outbreak of the pandemic. According to Corsello and Tagliabracci (2023), in the first nine months of 2022, energy inflation accounted on average for more than 60 per cent of headline inflation in the euro area, either directly or indirectly. The same result holds qualitatively for the four largest euro area countries, albeit with some quantitative differences.[10]

The paper is structured as follows. Section 2 illustrates the econometric model. Section 3 describes the data. Section 4 shows the main results. Section 5 concludes.

2. The model

In what follows we give a brief overview of the BB model. For equations and details, we refer the reader to Bernanke and Blanchard (2023).

In each quarter, the nominal wage growth is equal to the expected rate of inflation in the previous quarter, the difference between the price level in the previous period and the price level expected for that period (catch-up term), and a term related to labor market tightness, that is, the ratio of job

[8] Similarly, Depalo and Lo Bello (2024) consider an augmented version of the framework of Bernanke and Blanchard (2023) for the euro area and find that the role played by labor market developments was comparatively much smaller to the one found for the US. More generally, Lo Bello and Viviano (2024) provide some considerations on the appropriateness of the Phillips Curve after the pandemic.

[9] Similar results are find by Menz (2024), de Walque and Lejeune (2024), Haskel et al. (2023) using data for Germany, Belgium, and United Kingdom, respectively.

[10] Conflitti and Luciani (2019) show, for the US and euro-area economies, that changes in oil prices mainly pass through to core inflation (or rather to inflation excluding food and energy products) by means of macroeconomic factors; while the effect is limited, it is statistically different from zero and persists over time.

vacancies to unemployment.[11] When estimating the model, wage growth also depends on an exogenous trend in productivity growth.

The consumer inflation rate depends on the nominal wage growth and on changes in a shock term that captures the relative costs of non-labor inputs, variations in mark-ups, and other factors affecting price-setting. When estimating the model, the shock term is fleshed out by including variables such as commodity price shocks and measures of supply-chain disruptions that raise prices given wages. Since prices should depend on unit labor costs rather than wages per se, a productivity trend is also included in the price equation.

Short-run inflation expectations are a weighted average of long-run inflation expectations and last period's inflation. Long-run inflation expectations evolve as a weighted average of last period's long-run inflation expectations and actual inflation. Both equations allow for a degree of anchoring (estimated on the data) of the corresponding inflation expectations.

The estimation strategy in BB approximates a structural vector autoregression with additional exogenous variables. Restrictions are imposed on the contemporaneous relationships between variables based on the theoretical model, but the coefficients on the lagged variables are left largely unrestricted. Specifically, in each estimated equation, four lags of each of the endogenous and exogenous variables are included in that equation, but only one lag of the productivity trend (which is constructed as an eight-quarter moving average) in the price and wage equations. Identification of the wage equation is achieved by assuming that wages react to other variables with a lag of one quarter. Wage inflation then affects price inflation, and, by implication, inflation expectations contemporaneously. Moreover, a homogeneity restriction is imposed on the estimates: in the long run, a given change in inflation implies an equal change in short-run and long-run inflation expectations (the restriction can be interpreted as requiring the long-run Phillips curve to be vertical).

3. Data description

Table 1 below lists the mnemonics and data sources of the endogenous and exogenous variables in the empirical model. Our choice of variables aims to select the series that are as close as possible to

[11] The catch-up term implies that workers, in their bargaining with employers, seek to be compensated for the unexpected inflation of the last period in order to recover some of the past real wage losses due to unexpected price increases.

those used in the BB.[12] The sample covers the period 1999Q1-2023Q2. Where series are not available, we use linear projections in order to have a balanced dataset.

Figure 1 shows the evolution of the *endogenous* variables over the sample in consideration. The upper panels illustrate the evolution of price and wage inflation. After two decades of low and relatively stable inflation, consumer prices increased significantly after the pandemic period. Wage dynamics, however, kept hovering at very low levels. The bottom charts show the dynamics of short- and long-term inflation expectations. Short-term inflation expectations were quite low in the 2010s and then spiked up in 2022 mirroring actual inflation, although they remained largely below the realized values of inflation. Long-term inflation expectations hovered around 2 per cent and thus remained fairly anchored to the inflation target.

Figure 2 shows the evolution of the main *exogenous* variables. The energy and food components, which are the most volatile items in the inflation basket, display some exceptional peaks in 2022. For example, the variation of energy (with respect to wages, as defined in Table 1) is close to 100% (annualized) in 2022Q4. Food inflation shows a qualitatively similar pattern, although the increase is smaller in magnitude. In the bottom panels, the left chart shows that the evolution of the labor market tightness is a slow-moving process, with a peak in 2022. Similarly, the Global Supply Chain Pressure Index (GSCPI), which measures the intensity of supply-chain problems, reaches historically high values in the post-pandemic period as a consequence of strong supply chain bottlenecks.

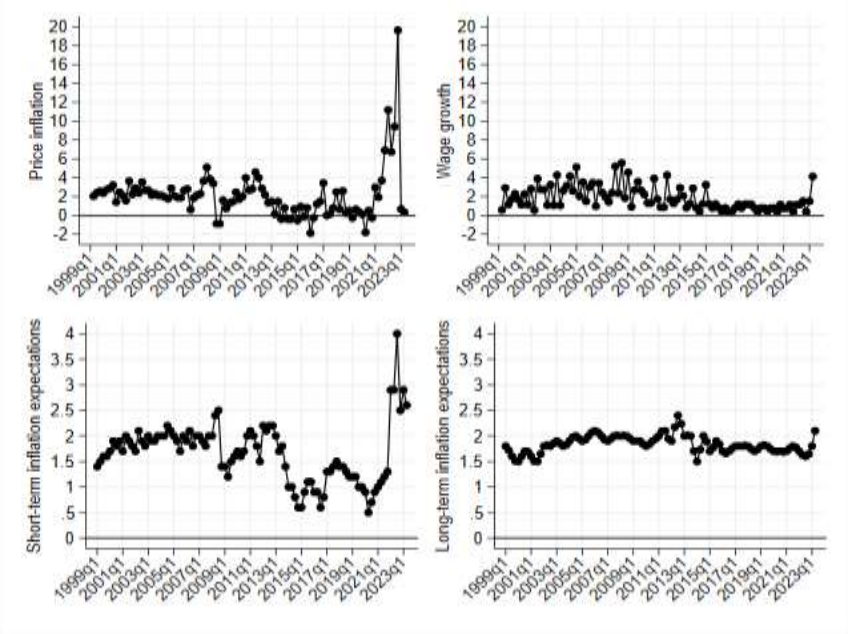
[12] Differently from BB, we use negotiated wages because they reflect the outcome of collective bargaining processes and are a reliable indicator of wage pressures. It differs from compensation of employees, which consists of wages and salaries in cash and in kind plus employers' social contributions. We also estimated the model using compensation per employee and compensation per hours, but the results are strongly affected by the swings observed in the series during the pandemic, which reflect measurement issues related to the statistical treatment of employees benefitting from job retention schemes.

Table 1: Variables and mnemonics used in estimation of the model

Endogenous variables			
Ticker	**Description**	**Source**	**Transformation**
gp	Consumer price inflation, as measured by quarterly annualized rates of change in the Harmonized Index of Consumer Price (HICP)	ECB	QoQ% annualized
gw	Rate of growth of nominal wages, as measured by the rate of change in private sector contractualized wages	ISTAT	QoQ% annualized
cf1	Short-term inflation expectations, measured by one-year inflation expectations as constructed by Consensus Economics	Consensus Economics	-
cf10	Long-term inflation expectations, measured by the Consensus Economics's ten-year inflation expectations annual series (our quarterly interpolation)	Consensus Economics	-
catch-up	Losses to workers' purchasing power due to inflation, measured by the 4Q-average of CPI inflation minus the one-year inflation expectation four quarters earlier. Catch-up is a linear combination of past gp and cf1.		
Exogenous variables			
Ticker	**Description**	**Source**	**Transformation**
grpe	Rate of growth of the relative price of energy, measured as the rate of change of the ratio of CPI energy prices to the private sector contractualized wages	ECB	QoQ% annualized
grpf	Rate of growth of the relative price of food, measured as the rate of change of the ratio of CPI food prices to the private sector contractualized wages	ECB	QoQ% annualized
v/u	Ratio of job vacancies to unemployment.Vacancy data from ISTAT available from 2004Q1, earlier data based on our elaboration.	ISTAT	-
shortage	GSCPI from New York Fed (lagged)	NYFED	Standardized
gpty	Trend productivity growth, measured by the change in the eight-quarter moving average of nonfarm business value added divided by nonfarm employee hours	ISTAT	

Figure 1: Main endogenous variables

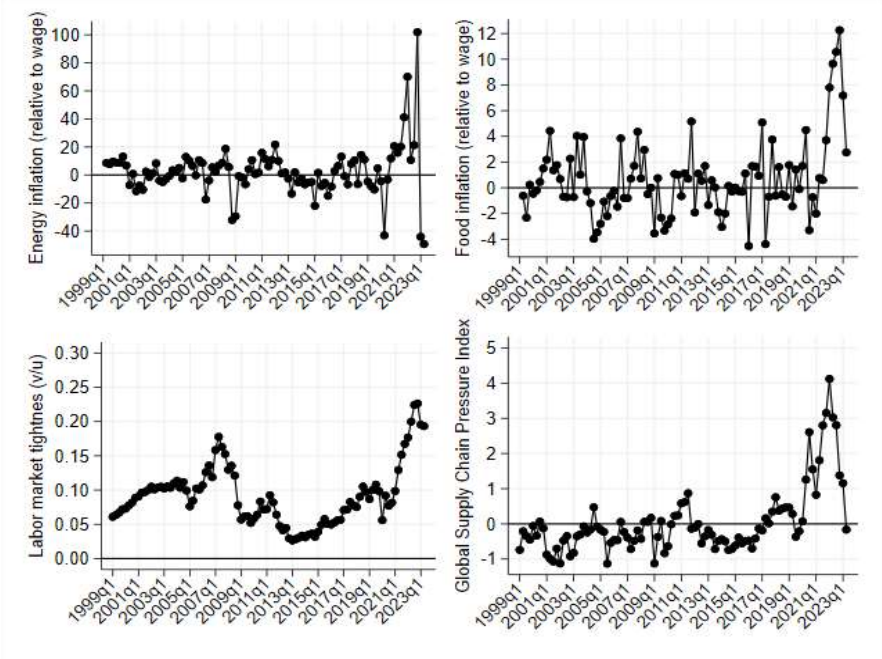
(annualized quarter-on-quarter changes (top); year-on-year inflation rate (bottom))



Source: Authors' calculations on data from ECB, Eurostat and Consensus Economics.

Figure 2: Main exogenous variables

(annualized quarter-on-quarter changes (top); percent and standardized values (bottom))



Source: Authors' calculations on data from Eurostat, ISTAT and NYFED.

4. The empirical results

In this section, we present the main empirical evidence obtained with the model discussed in Section 3. In particular, we first look at the estimated coefficients to understand the relationship between the main variables of interest (Section 4.1). Then, we assess the fit of the model during and after the COVID-19 period, i.e. since the beginning of 2020, in order to analyze the stability of the relationship between the variables (Section 4.2), and we report the historical decomposition, to learn about the economic drivers of price and wage inflation (Section 4.3). The last section summarizes the main results and discusses the potential issues with our analysis related to the structure of the Italian labor market.

4.1 Estimated coefficients

Table 2 reports the estimated price inflation regression over the full sample. We find that energy prices, food inflation and wages (grpe, grpf, and gw, respectively) are significant determinants of headline inflation (both jointly as well as their sum) and that, once these are controlled for, the own lags of headline inflation do not contribute to explaining price dynamics. The relationship between shortages and inflation is mildly significant, while the relationship between trend productivity growth and inflation is not significant. Overall, the R-squared is very high, suggesting that the model is able to capture the dynamics of price inflation quite well.

Table 2. Consumer price inflation regression (dependent variable = gp) – full-sample

Independent variable	**gp**	**gw**	**grpe**	**grpf**	**shortage**	**gpty**
Lags	-1 to -4	0 to -4	0 to -4	0 to -4	0 to -4	-1
Sum of coefficients	0.346	0.654	0.058	0.422	0.275	-0.008
p-stat (sum)	0.165	0.010	0.028	0.007	0.071	0.922
p-stat (joint)	0.513	0.005	0.000	0.000	0.335	0.922
R-squared			0.956			
No. Observations			90			

Table 3a contains results of the wage inflation regression estimated over the pre-COVID period. The fit is not entirely satisfactory (the R-squared is relatively low, see also next Sections). Labor market conditions, as measured by the vacancy-to-unemployment ratio (v/u), are statistically significant. Short-term inflation expectations, proxied by the 1-year Consensus Economics forecast (cf1) and the lags of wage inflation (gw), are also significant. Instead, there is no evidence of statistically significant effects of catch-up (catch-up) and moving-average trend in productivity growth (gpty).

Table 3a. Wage inflation regression (dependent variable = gw) – until 2019Q4

Independent variable	**gw**	**v/u**	**catch-up**	**cf1**	**gpty**
Lags	-1 to -4	-1 to -4	-1 to -4	-1 to -4	-1
Sum of coefficients	0.223	0.563	-0.292	0.777	0.188
p-stat (sum)	0.352	0.009	0.190	0.002	0.172
p-stat (joint)	0.001	0.005	0.163	0.009	0.172
R-squared			0.549		
No. Observations			76		

For robustness, we also estimated the very same wage inflation equation over the full sample, thus extending until 2023Q2 and including the COVID period. Table 3b shows the results. They do not greatly change with respect to the pre-COVID estimation reported in Table 3a. Importantly, as reported above for the pre-COVID estimation, the catch-up does not have a statistically significant effect on wage growth. The coefficients of the wage inflation lags are jointly statistically significant. Similarly, the coefficients of labor market conditions and inflation expectations are statistically significant, albeit to a lower extent than in the case of pre-COVID estimation.

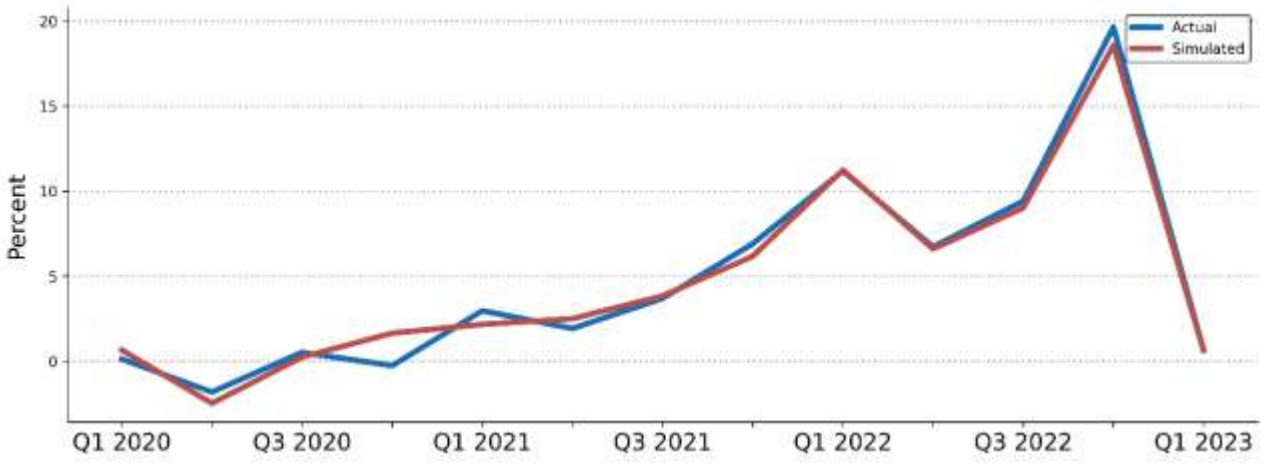
Table 3b. Wage inflation regression (dependent variable = gw) – full-sample

Independent variable	**gw**	**v/u**	**catch-up**	**cf1**	**gpty**
Lags	-1 to -4	-1 to -4	-1 to -4	-1 to -4	-1
Sum of coefficients	0.455	0.399	-0.137	0.545	0.098
p-stat (sum)	0.022	0.030	0.292	0.006	0.402
p-stat (joint)	0.000	0.023	0.251	0.052	0.402
R-squared			0.526		
No. Observations			90		

4.2 Fit

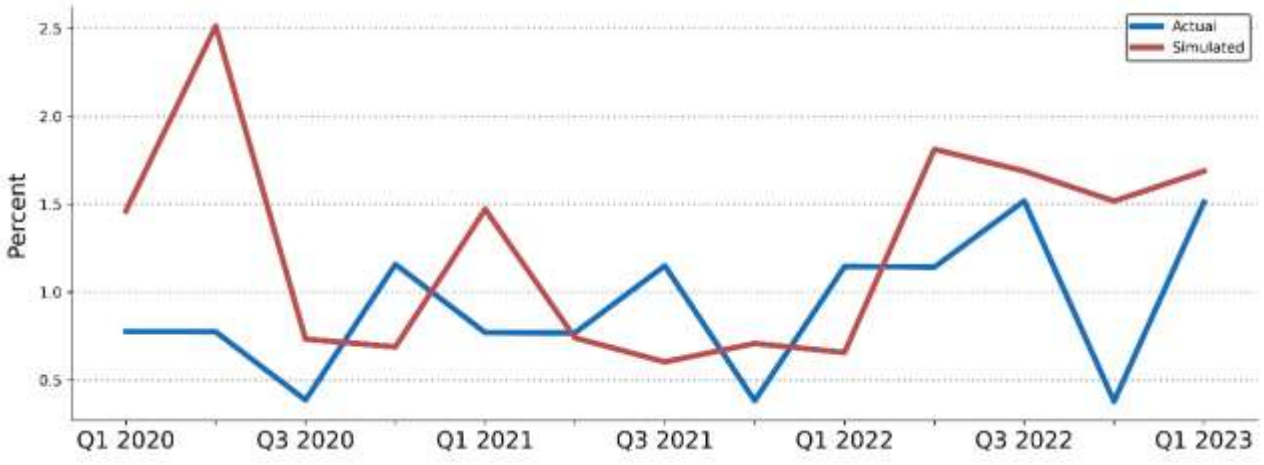
As a check on the model specification, BB propose to look at how the price equation estimated on the pre-COVID sample fits the wage data during the COVID-19 period (2020Q1-2023Q1). As shown in Figure 3, the estimated price equation simulates the price behavior after 2019 extremely well. In particular, the fitted equation captures not only the price increase over the whole period, but also the price decrease in 2023Q1.

Figure 3: Inflation, 2020Q1-2023Q1, actual vs. simulated values equation
(annualized quarter-on-quarter changes)



As a further check, we also look at how the wage equation estimated on the pre-COVID sample fits the wage data during the COVID-19 period. As shown in Figure 4, the estimated wage equation describes the wage behavior quite poorly after 2019. The fitted values tend, to some extent, to over-estimate wage growth, which was almost nil in Italy during the pandemic period.

Figure 4: Wage growth, 2020Q1-2023Q1, actual vs. simulated values
(annualized quarter-on-quarter changes)



4.3 Historical decomposition

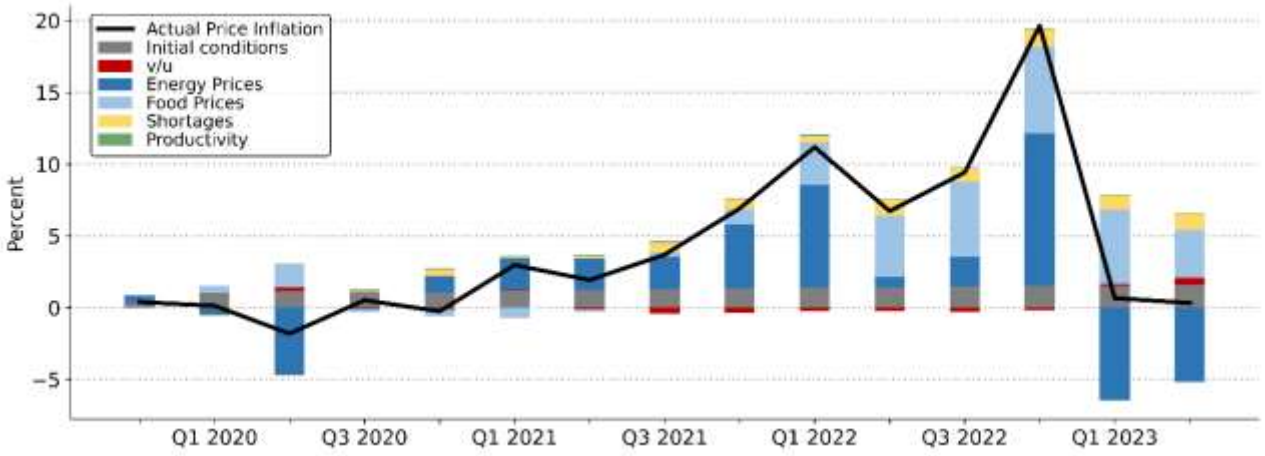
Figures 5 and 6 show, respectively, the decomposition of the annualized quarter-on-quarter growth rates of Italian consumer prices and wages into their sources over the period 2019Q4-2023Q2. Each bar represents the contribution of a shock, measured as the deviation of the corresponding exogenous variable from zero in the case of relative energy and food prices and from its pre-COVID sample average in the case of other exogenous variables. The contribution of initial conditions indicates how inflation and wages would have evolved in the absence of shocks. Figures 5 and 6 also show the actual value of inflation and wage growth (black solid lines), respectively. The fit of the model in the post-COVID period can be assessed by looking at the contributions of the residuals (not reported), that is, the difference between fitted and actual inflation (the fitted inflation is the algebraic sum of the contributions). For consumer inflation the residuals are small, while they are large for wage growth, consistent with the corresponding charts in Section 4.2.

The model explains Italian consumer price inflation in the post-COVID period by energy, food and, to a much lesser extent, shortage shocks (Figure 5). These results are in line with model replications conducted for other countries and summarized in Bernanke and Blanchard (2024). The contribution of the energy component starts in 2021 and peaks in 2022Q4. The reversal in energy prices causes headline inflation to fall sharply in early 2023.

Last but not least, labor market tightness does not play any significant role in explaining the fluctuations of Italian headline inflation, consistent with the modest effect of labor market conditions

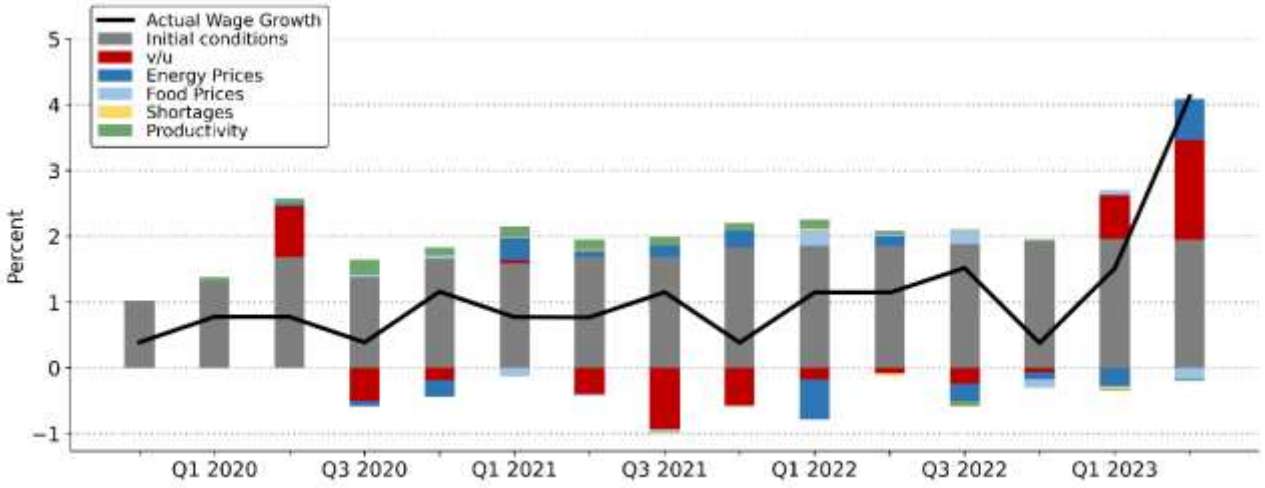
on wage growth (Figure 6). The latter is rather limited and mainly explained by initial conditions (and, thus, not explained by any of the shocks considered). The exception is the increase in wage growth in 2023Q1 and 2023Q2, due to the rise in the contribution of the vacancy-to-unemployment ratio.

Figure 5: Decomposition of consumer price inflation
(annualized quarter-on-quarter changes and percentage points)



Note: The figure shows a decomposition of the sources of inflation, 2020Q1 to 2023Q2, based on the solution of the full model and the implied impulse response functions. The continuous line shows actual inflation, and the total net heights of the bars are the model's forecast of inflation in each period, given initial conditions through 2019Q4 and excluding the effects of equation residuals. The grey portion of each bar shows the contribution of pre-2020 data (and also include the contributions of productivity shocks). Colored segments of each bar show the general equilibrium, fully dynamic contribution of each exogenous variable to inflation in that period, as implied by the estimated model.

Figure 6: Decomposition of wage inflation
(annualized quarter-on-quarter changes and percentage points)



Note: The figure shows a decomposition of the sources of nominal wage growth, 2020Q1 to 2023Q2, based on the solution of the full model and the implied impulse response functions. The continuous line shows actual wage growth, and the total (net) heights of the bars are the model's forecast of wage growth in each period, given initial conditions through 2019Q4 and excluding the effects of equation residuals. The grey bar shows the contribution of pre-2020 data (and also includes the contributions of productivity shocks). Colored segments of each bar show the general equilibrium, fully dynamic contribution of each exogenous variable to wage growth in that period, as implied by the estimated model.

4.4 What have we learnt?

Some lessons can be drawn from the reported results. First, the relatively poor fit of the wage equation suggests that the moderate negotiated-wage growth in Italy over the considered period does not seem to depend, overall, on labor market cyclical conditions, as proxied by the vacancy-to-unemployment ratio, and on the rise in price inflation. This is not very surprising given the remaining slack in the labor market, mainly due to the partial recovery in the number of hours worked per capita, and above all the wage setting mechanisms in Italy. Wages are mostly negotiated at sectoral level and they will tend to be relatively more subdued in the sectors that were most affected by the energy shock and where the unions' bargaining power is lower. Moreover, contracts are not automatically indexed to inflation. Contract renewals are predominantly related to forward-looking inflation measures that exclude energy, and few have ex-post adjustments for past inflation shortfalls. More importantly, contract renewals are staggered, with very long contract durations (usually three years) and significant delays (in some cases, years) in renewing the expired ones.[13] All in all, this suggests that the exceptional price developments in 2022-23 largely still need to be transmitted to wages.

The second lesson is that Italian consumer price inflation was mainly triggered by large increases in the relative prices of energy and food, mainly reflecting adverse supply shocks, and, to much lesser extent, price spikes reflecting shortages, due to the combination of strong global demand and supply chain disruptions. As emphasized by Bernanke and Blanchard (2024) for the case of major industrialized countries, despite their size, which led to large contemporaneous effects on inflation, the effects of these shocks to prices ultimately did not last for very long, for three reasons. First, even if energy, and to a lesser extent food, are intermediate inputs in the production of other goods, they had only limited and short-lived dynamic effects on the prices of these other goods. Second, as noted above, workers 'catch up', i.e. get employers to compensate them retroactively for the loss in real wages due to unexpected inflation, only partially in the short run.[14] Third, higher inflation has not led to higher expected inflation, both in the short-and the long-term and, thus, to higher nominal wage increases,

[13] As for the public sector, in Italy several contracts were renewed in Q4 2022, but this renewal was long overdue and not a direct response to the current inflationary phase. Moreover, the public sector operates under different bargaining mechanisms and is influenced by other factors, which may not necessarily be tied to the state of the business cycles.

[14] According to Battistini et al. (2022), compared to the 1970s, second-round effects from higher energy prices on inflation have been largely absent on average since 1999 in the euro area. Koester and Grapow (2021) suggest that the likelihood of wage-setting schemes triggering second-round effects based on inflation indexation is relatively limited in the euro area, particularly when it comes to energy inflation.

and consequently, further price increases (the so-called "wage-price spiral"). Long-term inflation expectations remained firmly anchored, reflecting the credibility of the inflation rate target set by the ECB.[15]

5. Conclusions

The analysis presented in this paper shows that the BB model, when estimated using Italian data, captures quite well the dynamics of consumer prices in the post-pandemic period, which was mainly driven by the energy and food components. In contrast, the fit for the wage dynamics in the very same period does not appear to be entirely satisfactory, as the wage equation does not adequately capture key institutional features of the Italian labor market.

Nevertheless, our findings on consumer inflation dynamics have clear and general implications for monetary policy. The credibility of the central bank's inflation target has been precious in the post-pandemic period: in the face of a long series of adverse price shocks, long-term inflation expectations have not been de-anchored, so that the effects of price shocks (energy, food, and to a lesser extent, shortages) have largely and quickly dissipated. Finally, our results provide suggest that further work is needed to model the impact of labor market characteristics on wage dynamics for the case of Italy. We leave this to future research.

[15] See Blanchard and Riggi (2013) for the role of central bank credibility in a structural analysis of changes in the macroeconomic effects of oil prices in the US.

References

Arce, Ó., M. Ciccarelli, A. Kornprobst and C. Montes-Galdón (2024). "*What caused the euro area post-pandemic inflation? An application of Bernanke and Blanchard (2023)*", Occasional Paper Series, ECB, n. 343.

Battistini, N., H. Grapow, E. Hahn and M. Soudan (2022). "*Wage share dynamics and second-round effects on inflation after energy price surges in the 1970s and today*", Economic Bulletin Boxes, European Central Bank, vol. 5.

Bernanke, B. S. and O. J. Blanchard (2024). "*Analysing the inflation burst in eleven economies*", in English, B., K. Forbes, A. Ubide (eds.), *Monetary Policy Responses to the Post-Pandemic Inflation*, CEPR, Chapter 16.

Bernanke, B. S. and O. J. Blanchard (2023). "*What Caused the US Pandemic-Era Inflation?*", NBER Working Papers 31417, National Bureau of Economic Research, Inc.

Blanchard, O. J. and M. Riggi (2013). "*Why are the 2000s so different from the 1970s? A structural interpretation of changes in the macroeconomic effects of oil prices*", Journal of the European Economic Association, vol. 11(5), pages 1032-1052.

Bottone, M., A. Tagliabracci and G. Zevi (2022). "*Inflation expectations and the ECB's perceived inflation objective: Novel evidence from firm-level data*", Journal of Monetary Economics, vol. 129(S), pages 15-34.

Bulligan, G., F. Corsello, S. Neri and A. Tagliabracci (2021). "*De-anchored long-term inflation expectations in a low growth, low rate environment*", Questioni di Economia e Finanza (Occasional Papers) 624, Bank of Italy.

Ciccarelli, M. and B. Mojon (2010). "*Global Inflation*", The Review of Economics and Statistics, vol. 92(3), pages 524-535.

Conflitti, C. and M. Luciani (2019). "*Oil Price Pass-through into Core Inflation*", The Energy Journal, vol. 40(6).

Corsello, F., M. Gomellini and D. Pellegrino (2023). "*Inflation and energy price shocks: lessons from the 1970s*", Questioni di Economia e Finanza (Occasional Papers) 790, Bank of Italy, Economic Research and International Relations Area.

Corsello, F., S. Neri and A. Tagliabracci (2021). "*Anchored or de-anchored? That is the question*", European Journal of Political Economy, vol. 69(C).

Corsello, F. and A. Tagliabracci (2023). "*Assessing the pass-through of energy prices to inflation in the euro area*", Questioni di Economia e Finanza (Occasional Papers) 745, Bank of Italy, Economic Research and International Relations Area.

Depalo, D. and S. Lo Bello (2024). "*Accounting for the recent inflation burst in the euro area*", Bank of Italy Occasional Paper, forthcoming.

de Walque, G. and T. Lejeune (2024). "*What caused the post-pandemic era inflation in Belgium? Replication of the Bernanke-Blanchard model for Belgium*", mimeo.

Haskel, J., J. Martin and L. Brandt (2023) "*Recent UK inflation: an application of the Bernanke-Blanchard model*", mimeo.

Koester, G. and H. Grapow (2021). "*The prevalence of private sector wage indexation in the euro area and its potential role for the impact of inflation on wages*", ECB Economic Bulletin 7/2021.

Lo Bello, S. and E. Viviano (2024). "*Some considerations on the Phillips Curve after the pandemic*", Bank of Italy Occasional Paper, forthcoming.

Menz, J. O. (2024). "*Sources of Post-Pandemic Inflation in Germany and the Euro Area: An Application of Bernanke and Blanchard (2023)*", Bundesbank Working paper, forthcoming.

Neri, S., G. Bulligan, S. Cecchetti, F. Corsello, A. Papetti, M. Riggi, C. Rondinelli and A. Tagliabracci (2022). "*On the anchoring of inflation expectations in the euro area*", Questioni di Economia e Finanza (Occasional Papers) 712, Bank of Italy.

Neri, S., F. Busetti, C. Conflitti, F. Corsello, D. Delle Monache and A. Tagliabracci (2023). "*Energy price shocks and inflation in the euro area*", Questioni di Economia e Finanza (Occasional Papers) 792, Bank of Italy, Economic Research and International Relations Area.

Ropele, T. and A. Tagliabracci, (2024). "*Perceived economic effects of the war in Ukraine: survey-based evidence from Italian firms*", Applied Economics Letters, vol. 31(4), pages 275-280, February.