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How high is the risk of a wage-price spiral?



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HOW HIGH IS THE RISK OF A WAGE-PRICE SPIRAL?

Recent high inflation rates have raised concerns of a wage-price spiral developing. Central banks have stressed they will closely monitor developments in the job market when setting interest rates to guard against this risk materialising. In this edition of *Infocus*, Amanda Cotti and GianLuigi Mandruzzato look at how prices and labour costs affect each other and the implications for monetary policy.

Wages and prices have surged in the past two years, leading to concerns of a wage-price spiral forming. Since wages constitute a substantial portion of firms' costs, a reasonable hypothesis is that rising wages will result in higher inflation.¹ However, according to the empirical literature, labour cost has little to no impact on inflation and is instead absorbed by firms' profit margins. Rather, changes in wages lag changes in consumer prices, indicating that inflation influences future wages but not *vice versa*.

Historical evidence on wage-price dynamics

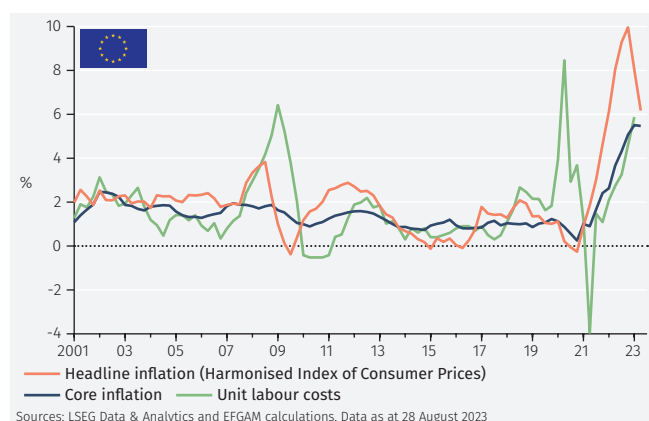
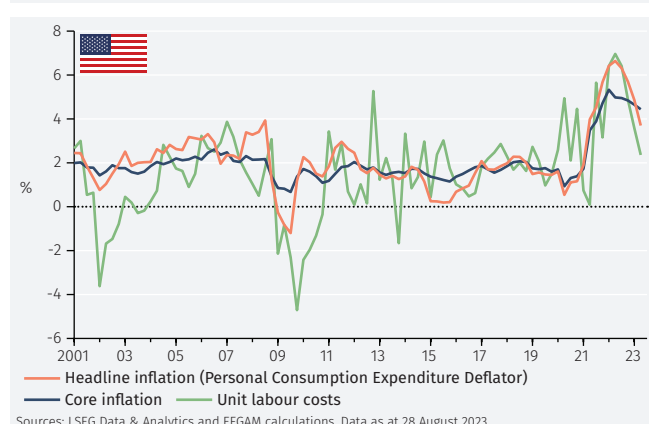
The International Monetary Fund (IMF) analysed 79 past episodes of wage-price spirals in advanced economies since the 1960s.² It concluded that 'the great majority' of sharp increases in inflation were not followed by sustained accelerations in wages and prices if they were short-lived. Instead, inflation and wage growth tended to stabilise close to their peak before moderating again in such a way that real wage growth also stabilised after the initial shock. Bernanke and Blanchard, in a recent working paper, reached similar results with regard to the recent rise in US inflation. They found that inflation was primarily driven by strong demand for goods and supply shortages rather than wage increases.³

Empirical research has also found that past inflation rates help forecast future changes in labour costs, but changes in labour costs fail to predict future inflation.⁴ One explanation of these results is that companies raise selling prices before rising wage costs hit profits. Employers may be ahead of the curve in anticipating the effects of a tight labour market, such that wages lag inflation.

Data in the US and eurozone indicate that wages have not kept pace with inflation since mid-2021, depressing real wages. Unemployment rates have remained low as labour demand has increased while labour supply has been slow to respond. Many commentators fear that tight labour markets will lead to mounting wage pressures and persistently high inflation.

However, businesses' decisions to raise prices due to changes in labour costs will also consider changes in labour productivity. Unit labour costs (ULCs) adjust wage growth for changes in labour productivity. If productivity increases it will reduce the adverse impact of higher wages on firms' profit margins and, hence, the pressure to raise prices. Annual changes in headline and core inflation and ULCs in the US and eurozone are shown in Figures 1 and 2. In the pre-pandemic period, ULCs appear to lag headline inflation and be insensitive to changes in core inflation. After the pandemic,

1&2. Year-on-year inflation and unit labour costs



¹ The wage-price spiral model can be explained as the process of adjustment of nominal prices to a change in aggregate demand. After an increase in aggregate demand, the process of adjustment of nominal prices and wages results from attempts by workers to maintain or increase their real wages and by firms to maintain or increase their markups of prices over wages.

² See Alvarez et al. (2022), 'Wage-Price Spirals: What is the historical evidence?' <https://tinyurl.com/bdedty2d>

³ See Bernanke and Blanchard (2023), 'What Caused the US pandemic-Era Inflation?', National Bureau of Economic Research <https://www.nber.org/papers/w31417>

⁴ Barlevy and Hu (2023), 'Unit labor costs and inflation in the non-housing service sector', Federal Reserve Bank of Chicago, found that unit labour cost does not provide significant help forecasting changes in inflation, but past inflation does help forecast changes in unit labour cost <https://tinyurl.com/7d5e5bhx>
Yasser and Danninger (2018) 'Understanding US wage dynamics', IMF, found that causality runs from prices to wages, though probably not from wages to prices. <https://tinyurl.com/36ujwv4>

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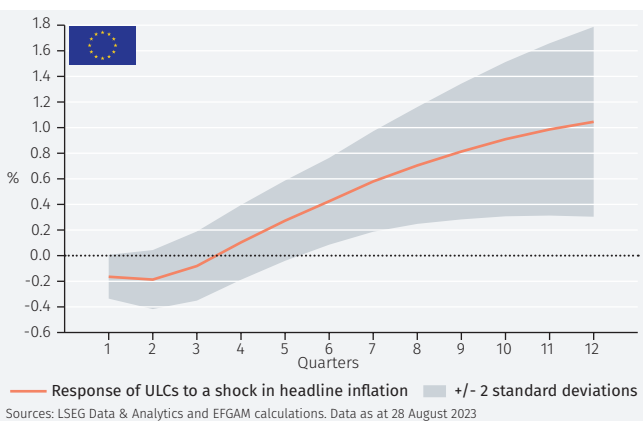
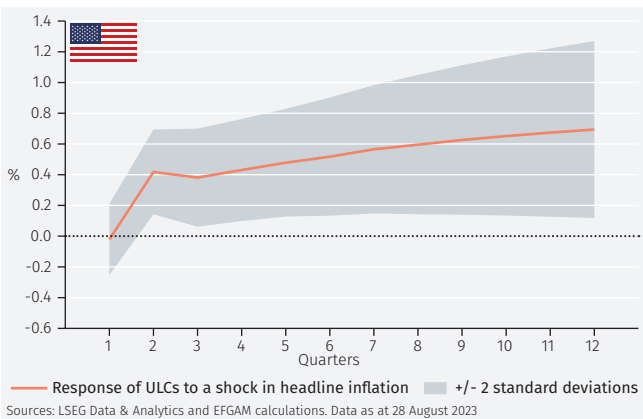
ULCs seem to have responded strongly to the increases in headline inflation in the US and closely followed the trend in core inflation in the eurozone.

Empirical evidence

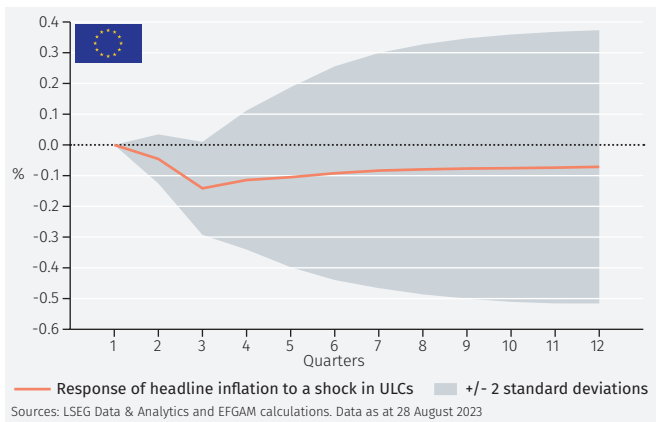
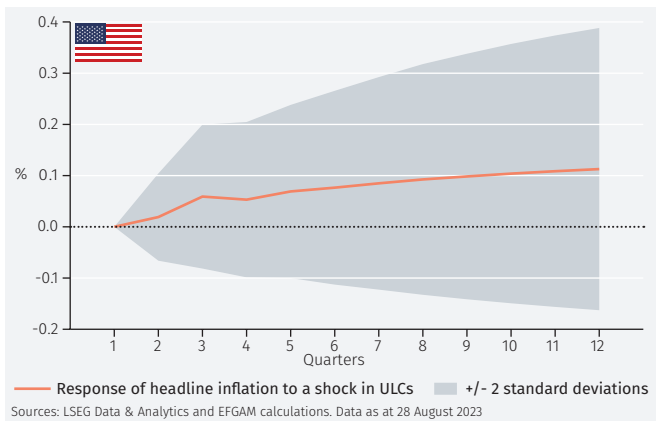
To investigate the empirical relationship between consumer prices and ULCs in the US and the eurozone a model is used to illustrate how they respond to shocks.⁵ The results are qualitatively similar in the US and the eurozone. The model shows that a one-standard deviation shock to headline inflation has a statistically significant and lasting impact on ULCs in both the US and the eurozone (see Figures 3 and 4). The response of ULCs increases over time in both areas, but it is much quicker in the US, where it becomes significant one quarter after the shock. In the eurozone, ULCs take more than a year before meaningfully responding to a shock to inflation.

In contrast, for both the US and eurozone, the estimates show that a shock to ULC affects neither headline nor core inflation immediately (see Figures 5 and 6). In line with the existing literature on the US economy, these results suggest that ULC shocks do not help forecast consumer prices and show that this seems to be the case in the eurozone too. Hence, the concern expressed by some members of the ECB Governing Council about the risk of a wage-price spiral appears excessive.⁶

3&4. Accumulated responses of ULC to shocks to headline inflation



5&6. Accumulated responses of headline inflation to ULC



Finally, the model shows that core inflation responds strongly to a shock to headline inflation in both the US and eurozone. The response is contemporaneous to the shock to headline inflation and rises over time, peaking after more than a year. This evidence helps explain why core inflation has risen so much in the last two years and has been so persistent, particularly in the eurozone where headline inflation peaked

⁵ A VAR model is estimated on headline and core inflation and unit labour costs, using two lags in the US and three in the eurozone. The PCE index was used in the US model and the HICP index was used in the eurozone model. All variables are quarterly averages and seasonally adjusted. The sample starts in Q1 2000 and ends in Q2 2023 for the US and in Q1 2023 for the eurozone. The correlation matrix of the model variables suggests that shocks to headline inflation come first, followed by shocks to core inflation and ULCs. However, since the reduced-form residuals are uncorrelated, the issue of identification does not arise. The Granger causality tests gave inconclusive results and were highly sensitive to the choice of the sample period. While this suggests some structural instability, unsurprising given the degree of the pandemic shock, more data will be needed to test this hypothesis.

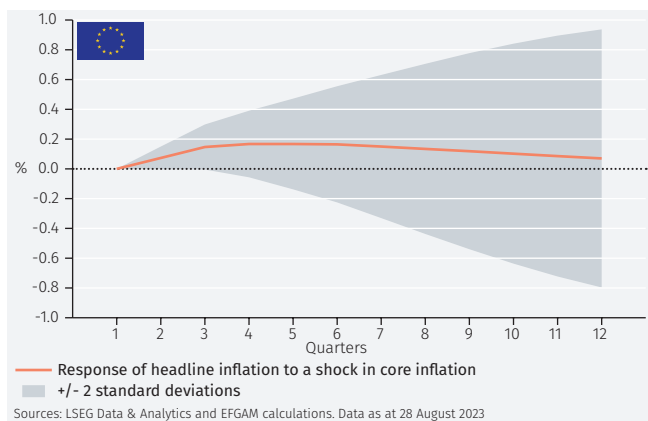
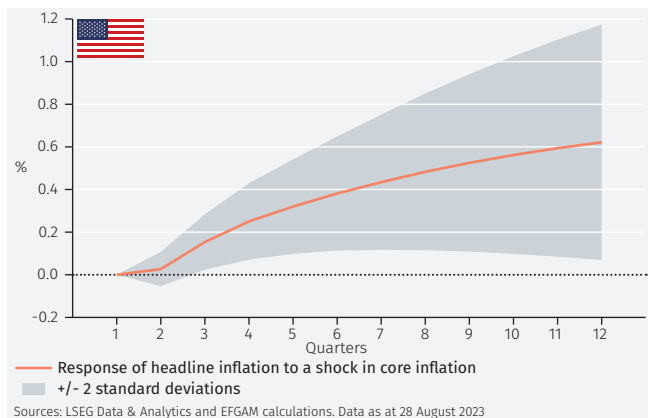
⁶ To test the robustness of the results, an alternative VAR model, tilted in favour of the wage-price spiral hypothesis, was estimated. In a VAR, the ordering of the variables matter as they are placed in decreasing order of relative exogeneity. Hence, the VAR was reordered placing ULC first followed by headline and core inflation. The results of the alternative model are not meaningfully different from those of the original model.

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higher and later than in the US. However, with headline inflation having fallen sharply for several months, one would expect core inflation to moderate soon.

Looking at the response of headline inflation to a shock to core inflation, the model points to notable differences between the US and eurozone (see Figures 7&8). In the US, headline inflation is affected by shocks to core inflation with a lag of two quarters, while the response of eurozone headline inflation to shocks to core prices is not statistically significant.⁷ These results support the concerns expressed by the Federal Reserve about the persistence of core inflation at a high level. However, with core PCE inflation having moderated since the end of last year, one would expect that if the recent trend is sustained it will push future headline inflation lower.

7&8. Accumulated responses of headline inflation to shocks to core inflation



Conclusions

The relationship between wages and inflation is complex and nuanced. While concerns about a wage-price spiral have been raised, the literature suggests that inflation is primarily driven by demand for goods and supply shortages rather than wages and labour costs. The empirical evidence shows that short-term inflation spikes resulting from wage increases do not normally lead to a sustained acceleration in wages and prices. Instead, inflation and nominal wage growth tend to stabilise.

The empirical investigation of the relationship between consumer prices and unit labour costs in the US and eurozone shows that ULCs respond to shocks to consumer price inflation but not the other way around. This has important implications for the current debate on future monetary policy in the two economies.

The Federal Reserve and the European Central Bank have often highlighted the risk that a tight labour market and high wage growth pose to price stability and that tight monetary policy is needed to prevent this risk from crystallising. However, with headline inflation having fallen sharply from the peak of last year, the empirical evidence suggests that wages will also slow in due course and that its behaviour, in isolation, does not justify the adoption of a more restrictive policy.

Overall, while wages do play a role in shaping inflation dynamics, they are just one part of a complex system of factors influencing price levels. Demand for goods, supply constraints, and employer pricing behaviour all contribute significantly to inflation outcomes.

⁷ To test the robustness of the results to changes in the sample period, the VAR was also estimated on the sample period 2000Q1-2019Q4. The main difference compared to the full-sample results is that the estimated responses to shocks are less pronounced, although their statistical significance is not affected. The only exception is the response of US headline inflation to a shock to core inflation which in the shorter sample period is not statistically significant as opposed to the estimates based on the full sample. Overall, this evidence suggests that the response of the variables to shocks may have intensified after the pandemic, but more data will be needed to test if that was the case.

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