

Causes and Implications of Elevated Inflation in Cyprus

Robert Beyer

SIP/2023/042

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on May 9, 2023. This paper is also published separately as IMF Country Report No 23/193.

2023
JUL



IMF Selected Issues Paper
European Department

Causes and Implications of Elevated Inflation in Cyprus
Prepared by Robert Beyer

Authorized for distribution by Wojciech Maliszewski
July 2023

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on May 9, 2023. This paper is also published separately as IMF Country Report No 23/193.

ABSTRACT: *Inflation has risen sharply in Cyprus, initially driven by imported prices, but increasingly broadening to domestic prices. A Phillips Curve estimate attributes the high inflation largely to energy prices, external price pressures, and inflation expectations at the end of 2022. Historically high pass-through of inflation shocks to wages—amplified by a tight labor market—may make inflation persistent. This calls for policies to stem inflationary pressures while protecting vulnerable households.*

RECOMMENDED CITATION: Beyer, Robert. Causes and Implications of Elevated inflation in Cyprus. IMF Selected Issues Paper (SIP/2023/042). Washington, D.C.: International Monetary Fund

JEL Classification Numbers:	E31, E52, E62, J31
Keywords:	Cyprus, Inflation, Import Prices, Energy Prices, Phillips Curve, Wages
Author's E-Mail Address:	rbeyer@imf.org

SELECTED ISSUES PAPERS

Causes and Implications of Elevated Inflation in Cyprus



CYPRUS

SELECTED ISSUES

May 9, 2023

Approved By
European Department

Prepared By Robert Beyer (EUR)

CONTENTS

CAUSES AND IMPLICATIONS OF ELEVATED INFLATION IN CYPRUS

A. Introduction	2
B. Recent Inflation Trends	2
C. Inflation Drivers: Phillips Curve Perspective	3
D. Wage Pass-Through	5
E. Inflation Outlook	5
F. Policy Recommendations	6

BOX

1. The Distributional Impact of Inflation	7
---	---

FIGURES

1. Inflation Trends	3
2. A Phillips Curve Perspective	4
3. Wage Pass-Through of Inflation Shocks	5
4. Inflation Expectations from Professional Forecasters	5
5. Profits and Producer Price Expectations	6

References	8
------------	---

ANNEXES

I. Estimation of European Phillips Curves	9
II. Estimation of Wage Response to Inflation Shocks	11

CAUSES AND IMPLICATIONS OF ELEVATED INFLATION IN CYPRUS¹

A. Introduction

1. As in all euro area countries, inflation surged in Cyprus in 2022, sparking concerns about its current and future impacts. A recovery in tourism started pushing up prices already in the second half of 2021, reversing declines during the pandemic. As the economy reopened, pent-up domestic demand and an ongoing tourism recovery pushed prices up further in 2022. The repercussions of the Russian invasion of Ukraine caused inflation to accelerate, especially due to the strong increase in oil prices.

2. Against this backdrop, this Selected Issue Paper discusses the causes and implications of elevated inflation in Cyprus.

- Section B describes recent inflation trends in Cyprus.
- Section C analyses drivers of inflation in with an augmented Phillips Curve.
- Section D investigates how wages adjust to inflation.
- Section E discusses implications for the inflation outlook.
- Section F draws policy conclusions.

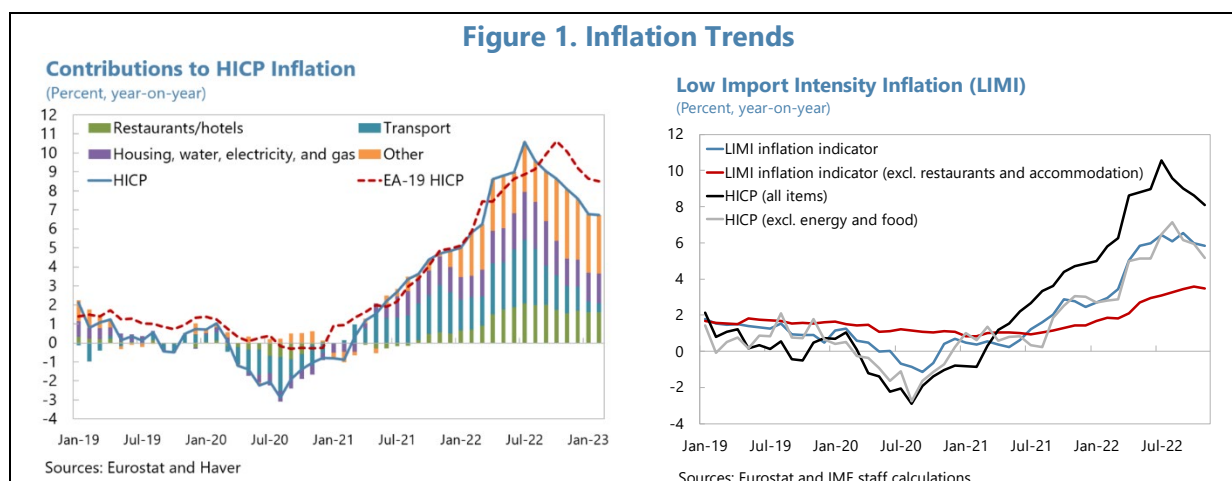
B. Recent Inflation Trends

3. Inflation in Cyprus was strongly affected by sectoral and external shocks, but over time has become more broad-based. The shocks, predominantly driven by tourism demand and supply as well as external and energy price pressures, appear to have had a larger impact than in the rest of the euro area, reflecting Cyprus's small size and import dependence. Over time, they passed-through to lower-frequency price movements due to second round effects.

- *Energy and other external price pressures were key drivers of inflation.* Oil prices declined during the pandemic but started recovering as its impact waned and jumped sharply after Russia's invasion of Ukraine (Figure 1, bottom left panel). In Cyprus, the pass-through to domestic energy and transport pricing was fast, amplified by euro depreciation (which made many other imports more expensive). Headline inflation peaked at over 10 percent in July 2022 as a result, with energy prices contributing 3 percentage points and transport pricing contributing 4 percentage points to the trough-to-peak increase of 13 percentage points from July 2020.
- *Prices related to tourism also played a crucial role during and after the COVID-19 pandemic.* Tourism suffered more than other activities from travel restrictions and other pandemic

¹ Prepared by Robert Beyer (EUR). The analysis benefitted from codes shared by Chikako Baba (EUR) and Ting Lan (EUR), excellent research assistance by Paul Tershakovec (EUR), as well as helpful comments and suggestions by Pietro Dallari, Wojciech Maliszewski, and Mark Horton (all EUR).

containment policies but rebounded strongly when restrictions were lifted. Tourism-related prices (especially of hotels and restaurants) first declined and then sharply increased, contributing 3 percentage points to the trough-to-peak increase in headline inflation. This impact (particularly the decline in prices during the pandemic) was much stronger than in the rest of the euro area as the weight of hotels and restaurants in Cyprus's consumption basket is significantly higher. Tourism demand also amplified the decline and subsequent increase in transport prices.



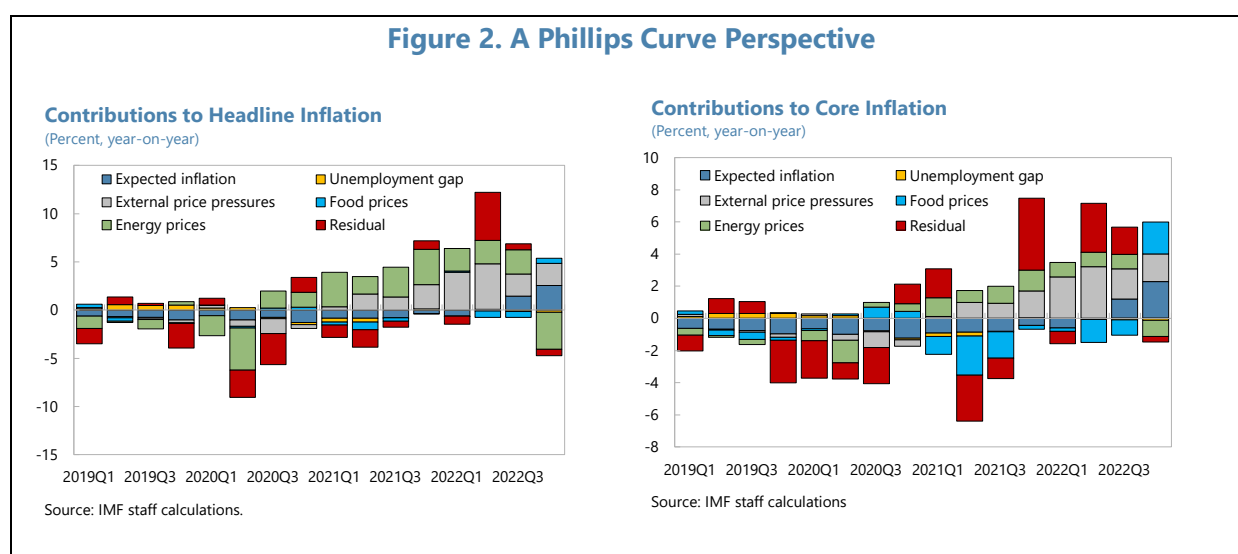
- *With a short delay, price pressures became more broad-based.* Core inflation—excluding food and energy prices—has been on an increasing trend before declining slightly more recently. To filter out the impact of imported prices and to capture domestic inflationary pressures more precisely, Fröhling, O'Brien, and Schaefer (2022) propose a measure of inflation for goods and services with low-import-intensity (LIMI). It follows core inflation closely but declines by less at the end of the sample. After further excluding tourism-related restaurants and accommodation (which are low-import-intensity but strongly affected by external demand), the resulting inflation measure started increasing later but is more persistent (Figure 1, bottom right panel), likely reflecting second-round effects (Section D).

C. Inflation Drivers: Phillips Curve Perspective

4. Phillips curves can provide insights into the drivers of inflation. In their most basic form, they link inflation to unemployment, but modifications include past inflation and inflation expectations. In addition, they may feature different cost-push factors. We augment the relationship with variables that proxy for price developments abroad and commodity prices (following IMF 2019). A lagged proxy of external price pressures embeds foreign producer price indices and exchange rates. Global energy and food prices (in domestic currency) are interacted with the shares of these items in the domestic consumer price index baskets. Due to data constraints in Cyprus, we replace three-year ahead inflation expectations (used in IMF 2019) with one-year ahead expectations, which does not change results materially for those countries with sufficiently long data series for both. We estimate this specification for a panel of countries to compare the inflation process in Cyprus with

those in advanced and emerging Europe. Annex I contains more information on the estimation and a table with the detailed results.

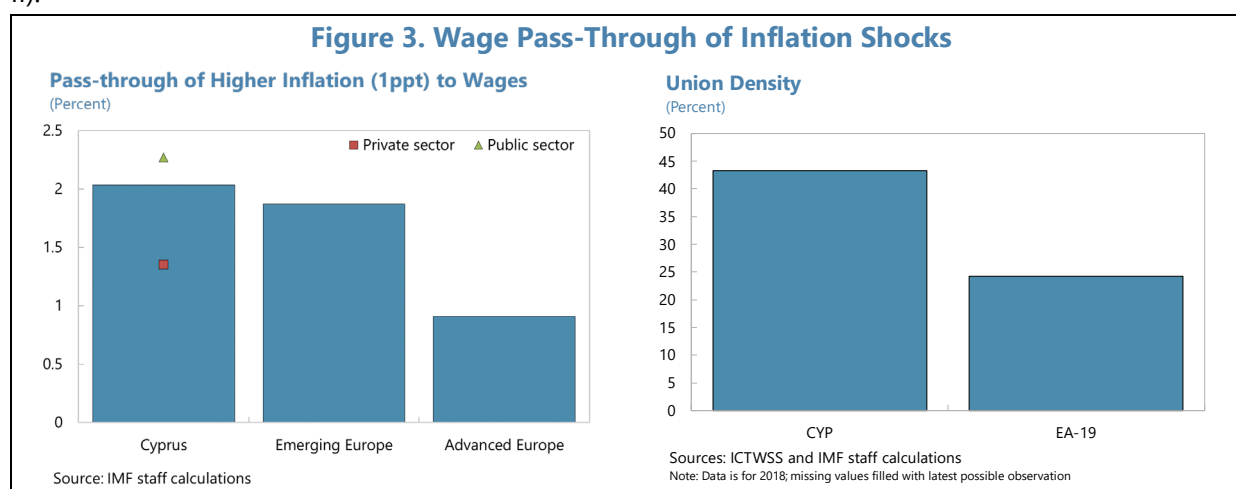
5. The Phillips curve results align with the description of recent inflation patterns. First, the pass-through of external price pressures and energy prices to both core and headline inflation is higher than in other euro area members (Figure 2 in Annex I), in line with Cyprus being a small island economy and hence depending on imports. The Phillips curve consequently attributes a large inflation contribution to external price pressures and energy prices during the first three quarters of 2022 (Figure 2), consistent with the impact of oil prices discussed in Section B. Inflation expectations are also more important than in the rest of the euro area. They started increasing throughout the year and—according to the Phillips curve—contributed considerably to inflation in the last two quarters of 2022.



6. Sectoral capacity constraints appear to play a more important role than the aggregate unemployment gap. The unemployment gap turned positive in 2022, but the Phillips curve attributes only a small contribution to overall inflation. This reflects a small coefficient of the gap in the Phillips curve—indicating a flat curve—but also points to the difficulty to properly capture economic slack with the unemployment gap (estimates of the output gap produce a slightly stronger but still small response—see Table 1 in the Annex). Sectoral demand/supply factors in tourism appear to have had a strong impact on inflation dynamics, and those seem instead reflected in the residual, which is large and negative during the deflation in 2021 and large and positive in the first three quarters of 2022. The residual has been larger in Cyprus than elsewhere, providing further indication that it could be related to sectoral pressures.

D. Wage Pass-Through

7. Estimating a pass-through from inflation shocks to wages can further help assess domestic price pressures. The response of wages to inflation shocks can be analyzed with the help of impulse response functions that unveil the pass-through over time. To understand the causal impact, one can restrict the analysis to changes in inflation caused by changes in international oil prices, which are exogenous to developments in Cyprus (oil price changes function as an instrument for inflation in the estimation). Following Baba and Lee (2022), such an estimation can be conducted with a local projection method that controls for other domestic developments (see details in Annex II).

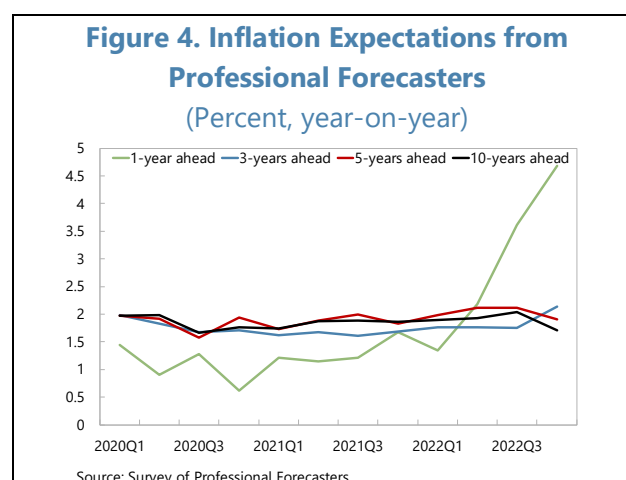


8. Wage pass-through of inflation is strong in Cyprus. The analysis suggests that a 1 percent increase in inflation raises wages in the private sector by 1.4 percent and in the public sector by 2.3 percent (Figure 3, left panel). This is considerably higher than in most advance economies in Europe. Baba and Lee (2022) show that pass-through in Europe tends to be higher in countries with higher union density, which could also contribute to the high pass-through in Cyprus (Figure 3, right panel).

E. Inflation Outlook

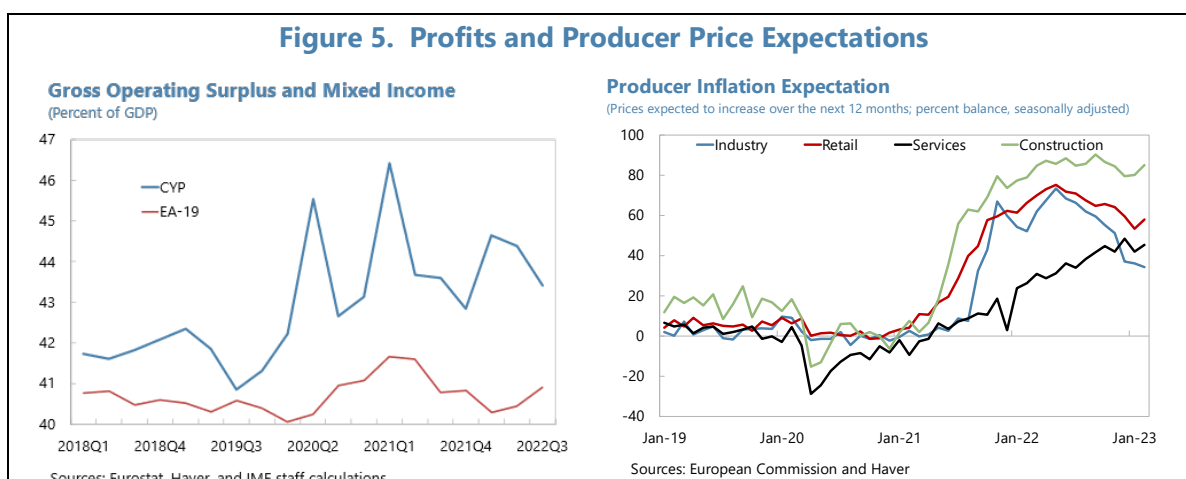
9. Elevated inflation is expected to persist.

- *Phillips curve estimates point to inflation moderating slowly.* This largely reflects elevated inflation expectations. The Survey of Professional Forecasters shows strong near-term inflation pressures, with 1-year inflation expectations surging in Q3 and Q4 of last year and an expectation that inflation will still exceed 4 percent at the end of 2023 (Figure 4). However,



expectations remain well anchored for longer horizons (3-, 5-, and 10-year), providing reassurance that the ECB's inflation goal maintains credibility in the medium-run.

- *Given the historical pass-through, wage pressures are expected to intensify this year, aggravated by labor market tightness.* The unemployment gap is positive and the vacancy-to-unemployment ratio still high. While there were only thirty vacancies per one hundred unemployed in Q1 2019, there were more than ninety in Q1 2022 and still sixty in Q4. Shortages are most severe in occupations related to tourism, but the increase in vacancies has been broad based.
- *With wages increasing, profit margins may shrink, but producer-price expectations suggest that shrinking margins will not be sufficient to stem inflation pressures.* So far, corporate profits have remained above their pre-Covid level and higher than in the rest of the euro area (Figure 5, left panel). There thus appears to be room for absorbing rising wages without passing them on to prices. However, producer inflation expectations plateaued at an exceptionally high level in services, retail sales, and construction, indicating that it may not be the case. This may reflect still strong demand in these sectors—consistent with the robust outlook for tourism—still giving companies pricing power (Figure 5, right panel).



F. Policy Recommendations

10. Fiscal policies should help containing price pressures. While external developments drove inflation dynamics in 2022, domestic developments will increasingly determine inflation going forward. Fiscal policy should hence support the battle against inflation, while protecting vulnerable households, which have been impacted disproportionately by the cost-of-living crisis (Box 1). Spending plans in the 2023 budget are sufficiently tight to help contain inflation pressures from aggregate demand.

11. Any upwards revisions to the automatic cost-of-living allowance (CoLA) would risk sustaining high inflation and weakening the economy structurally. The current level of the CoLA is set to half of previous year inflation and covers the public sector and unionized employees in the private sector (about 1/3 of the total). Negotiations among the unions, employers, and the Ministry of

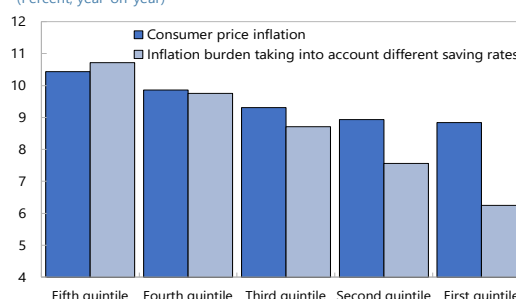
Labor and Social Affairs about a revision to the CoLA are ongoing. For the public sector, an upward revision would further increase in the relatively high wage bill and reduce fiscal space, while also making fiscal policy more pro-cyclical. For the private sector, the mechanism does not account for productivity developments and reduces the ability to adjust to adverse shocks, weakening economic resilience and competitiveness. Moreover, higher CoLA would deepen duality in the labor market, as it mostly benefits public sector employees and those private sector employees covered by collective agreements.

Box 1. The Distributional Impact of Inflation

Rising costs of living have had a larger impact on low-income earners, especially when considering different saving-consumption ratios.

Rising costs of living have had a larger impact on low-income earners. If prices increase differently and consumption patterns differ, household inflation can vary. Lower income households tend to spend a higher share of their income on transport and food—prices of both rose more than for other goods in 2022. Inflation for the fifth quintile of the income distribution was over 2 ppt higher than for the first quintile in December 2022. Similarly, the consumption of the unemployed and retired became more expensive than that of the average employed.

Inflation by Income Quintile, December 2022
(Percent, year-on-year)



Sources: Cystat, Eurostat, Haver, and IMF staff calculations

Other factors aggravate this heterogeneous impact. First, poorer households spend a larger share of their income on essential consumption and can hence adjust their spending less than others (this effect is absent in inflation rates based on fixed consumption baskets). Second, poorer households tend to consume a larger share of their income, so that the inflation burden relative to income is higher, i.e., all else equal their real income declines more. Considering different saving-consumption ratios in December 2022, inflation reduced real incomes close to 11 percent for households in the fifth income quintile but only by around 6 percent for those in the first. The overall impact of inflation on household balance sheets is less clear. On the one hand, assets of poorer households tend to be less likely to be protected from inflation. On the other hand, the traditional Fisher channel—through which inflation redistributes from lenders to borrowers—may benefit poorer households.

References

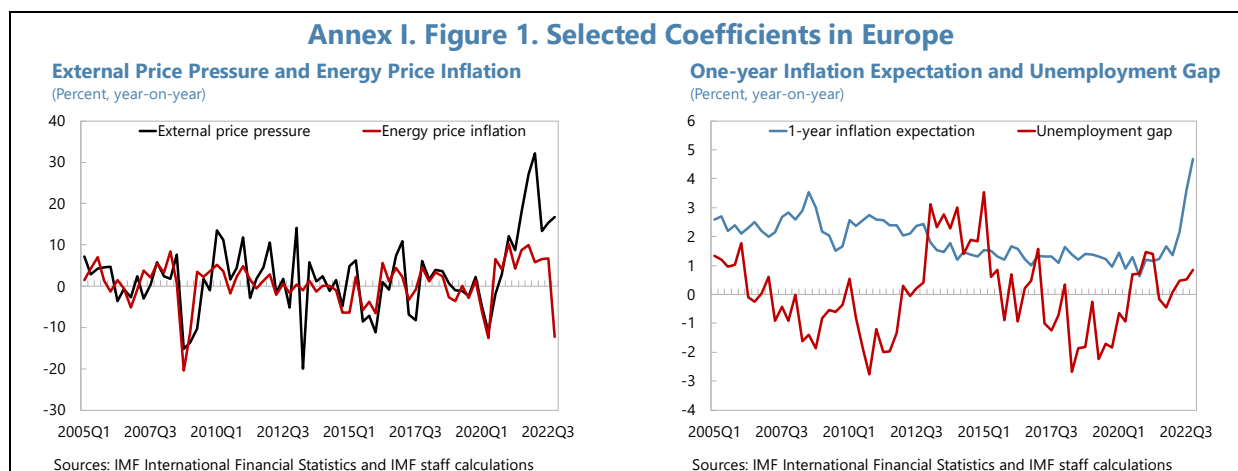
- Baba, C., & Lee, J. (2022). *Second-Round Effects of Oil Price Shocks—Implications for Europe’s Inflation Outlook*. IMF Working Papers, 173.
- Baba, C., Duval, R., Lan, T., & Topalova, P. B. (2023). *The 2020-2022 Inflation Surge Across Europe: A Phillips-Curve-Based Dissection*. IMF Working Papers, 23/30.
- Fröhling, A., O’Brien, D., and S. Schaefer. (2022). *A new Indicator of Domestic Inflation for the Euro Area*. ECB Economic Bulletin, Issue 4/2022. Frankfurt am Main.
- International Monetary Fund. (2022). *Regional Economic Outlook for Europe, October 2022*. Washington, D.C.

Annex I. Estimation of European Phillips Curves

1. We estimate a typical Phillips Curve. Our estimation strategy follows very closely IMF (2022) and Baba et al. (2023) and we hence only summarize it here. We estimate the following model:

$$\pi_{i,t} = \beta_1 \pi_{i,t-1} + \beta_2 \pi_{i,t}^e + \beta_3 u_{i,t} + \beta_4 \text{Energy}_{i,t} + \beta_5 \text{Food}_{i,t} + \beta_4 \text{Food}_{i,t-1} + \beta_5 \text{External}_{i,t-1} + \text{FE}_{i,t} + \varepsilon_{i,t}$$

where $\pi_{i,t}$ is the q-o-q annualized inflation rate (either headline or core) in country i in quarter t , $\pi_{i,t}^e$ denotes 1-year ahead inflation expectations, $u_{i,t}$ is the unemployment gap as an indicator of economic slack (deviation from HP filtered unemployment rate), $\text{Energy}_{i,t}$ and $\text{Food}_{i,t}$ are energy and food price inflation, respectively, both expressed in domestic currency and weighted by the share in the domestic CPI baskets, $\text{External}_{i,t-1}$ refers to lagged external price pressures, $\text{FE}_{i,t}$ are country fixed effects, and $\varepsilon_{i,t}$ is the error term. For Cyprus we also estimate a specification in which we replace the unemployment gap with the output gap (based on staff estimates).



VARIABLES	Core inflation					Headline inflation				
	(1) EUR	(2) EE	(3) AE	(4) CYP	(5) CYP (ygap)	(6) EUR	(7) EE	(8) AE	(9) CYP	(10) CYP (ygap)
Unemployment gap	-0.184*** (0.042)	-0.366*** (0.135)	-0.145*** (0.040)	-0.081 (0.183)	0.113* (0.057)	-0.302*** (0.058)	-0.620*** (0.188)	-0.189*** (0.048)	-0.232 (0.179)	0.045 (0.055)
Lag of inflation	0.532*** (0.076)	0.525*** (0.127)	0.540*** (0.042)	0.286** (0.112)	0.067 (0.116)	0.420*** (0.047)	0.353*** (0.082)	0.529*** (0.036)	0.102 (0.115)	0.279** (0.110)
Inflation expectations 1 year ahead	0.468*** (0.076)	0.475*** (0.127)	0.460*** (0.042)	0.714*** (0.112)	0.933*** (0.116)	0.580*** (0.047)	0.647*** (0.082)	0.471*** (0.036)	0.898*** (0.115)	0.721*** (0.110)
Lag of external price pressure	0.032*** (0.007)	0.061*** (0.017)	0.017*** (0.004)	0.073* (0.040)	0.140*** (0.048)	0.043*** (0.010)	0.067*** (0.024)	0.020*** (0.007)	0.138*** (0.049)	0.072* (0.041)
Food price inflation	0.066*** (0.021)	0.105** (0.043)	0.030*** (0.009)	-0.051 (0.060)	-0.004 (0.055)	0.100*** (0.028)	0.146*** (0.052)	0.050*** (0.013)	0.008 (0.054)	-0.054 (0.061)
Lagged food price inflation	0.043*** (0.014)	0.034 (0.026)	0.035*** (0.010)	-0.056 (0.069)	-0.046 (0.064)	0.041** (0.020)	0.049 (0.038)	0.017 (0.014)	-0.050 (0.065)	-0.055 (0.068)
Energy price inflation	0.018* (0.010)	0.032 (0.021)	0.023*** (0.007)	0.082 (0.059)	0.309*** (0.056)	0.160*** (0.013)	0.154*** (0.028)	0.177*** (0.010)	0.322*** (0.057)	0.076 (0.057)
Observations	2,594	505	2,089	74	74	2,692	587	2,105	74	74
Country FE	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

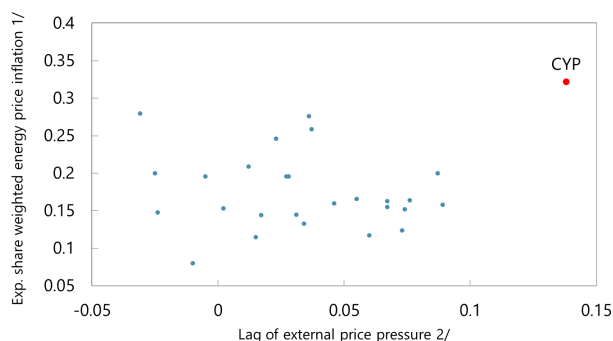
12. The external price pressure variable captures the changes in producer prices in trading partners and exchange rate fluctuations. As in IMF (2022) and Baba et al. (2023), the sum of coefficients on past and expected inflation rates are constraint to be equal to one. Different from them, we estimate the model with 1-year inflation expectations rather than 3-year ones due to data constraints in Cyprus and include only one lag of food prices rather than four as food prices play a smaller role in Cyprus than in other countries.

13. We estimate the model for 29 European countries: BEL, BGR, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ITA, LTU, LVA, NLD, NOR, POL, PRT, ROU, RUS, SVK, SVN, SWE, and TUR. Data is from the IMF's World Economic Outlook database, Eurostat, and Consensus Economics. The estimation period is from 2000Q1 to 2022Q4.

14. Table 1 shows the estimation results. It compares the results for Cyprus to three different panel regressions for

both headline and core inflation: for the whole sample in column one/six, for seven emerging European countries in column two/seven, and for twenty-five advanced European countries in column three/eight. Figure 2 plots the coefficients on external price pressures of all countries against the coefficients on energy prices (for headline inflation), showing that the high pass-through of these (and hence their crucial role for inflation dynamics) stands out among European countries.

Annex I. Figure 2. Selected Coefficients in Europe



Source: IMF staff calculations
1/ in Euros
2/ $DL_MNEER + DL_MPPI - DL_DEFL$

Annex II. Estimation of Wage Response to Inflation Shocks

1. We estimate a quarterly local projection model. Our estimation strategy follows Section 5.1. (Transmission via CPI inflation) in Baba and Lee (2022) and we hence only summarize it here. For each horizon $h=1,\dots,H$, we estimate the following model on quarterly data for Cyprus:

$$\Delta_h w_{t+h-1} = \alpha_h + \sum_{i=1} \beta_i(h) \Delta w_{t-i} + \sum_{i=1} \gamma_i(h) \Delta \text{cpi}_{t-i} + \sum_{i=1} \delta_i(h) \Delta y_{t-i} + \varepsilon_{t,h},$$

where $\Delta_h w_{t+h-1}$ refers to the cumulative growth in wages in h quarters from $t-1$, Δw_{t-1} and Δcpi_{t-1} are the quarterly wage growth and CPI inflation rate with a lag of i -quarter, and Δy_{t-1} refers to a set of control variables. Oil price shocks with lags of four quarters function as instruments for CPI inflation in the estimation to obtain the response of wages to the increase in inflation that has been induced by oil price shocks. The estimation period runs from 2000Q1 to 2019Q4 and hence excludes extraordinary effects of the pandemic. We estimate the model separately for overall wages, public wages, and private sector wages. Figure 1 shows the impulse response for the baseline estimation and public wages.

