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CYPRUS

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June 2023

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SELECTED ISSUES

May 9, 2023

Approved By
European Department

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CAUSES AND IMPLICATIONS OF ELEVATED INFLATION IN CYPRUS[1]

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.

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.

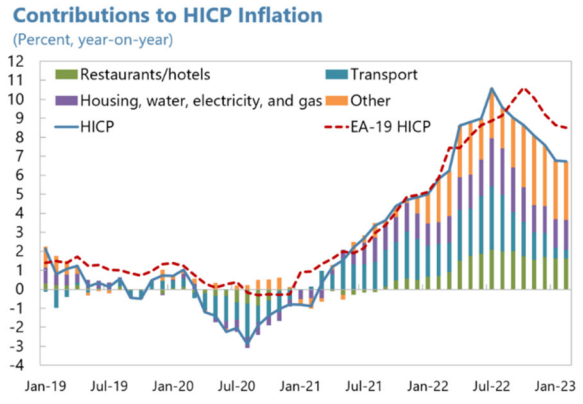
- *Energy and other external price pressures were key drivers of inflation.* Oil prices declined during the pandemic but started recovering as its impact waned and jumped sharply after Russia's invasion of Ukraine (Figure 1, bottom left panel). In Cyprus, the pass-through to domestic energy and transport 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,

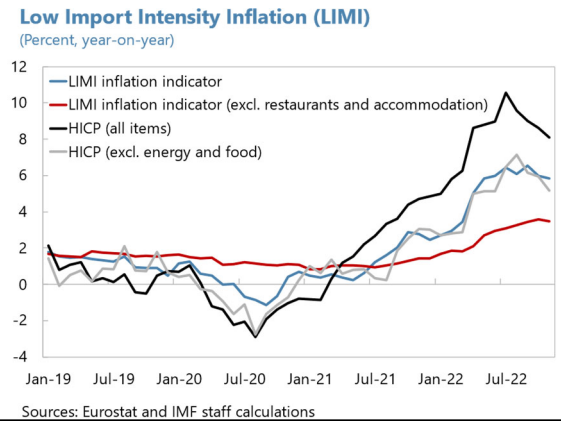
[1] Prepared by Robert Beyer (EUR). The analysis benefitted from codes shared by Chikako Baba (EUR) and Ting Lan (EUR), excellent research assistance by Paul Tershakovec (EUR), as well as helpful comments and suggestions by Pietro Dallari, Wojciech Maliszewski, and Mark Horton (all EUR).

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 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.

Figure 1. Inflation Trends





- *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).

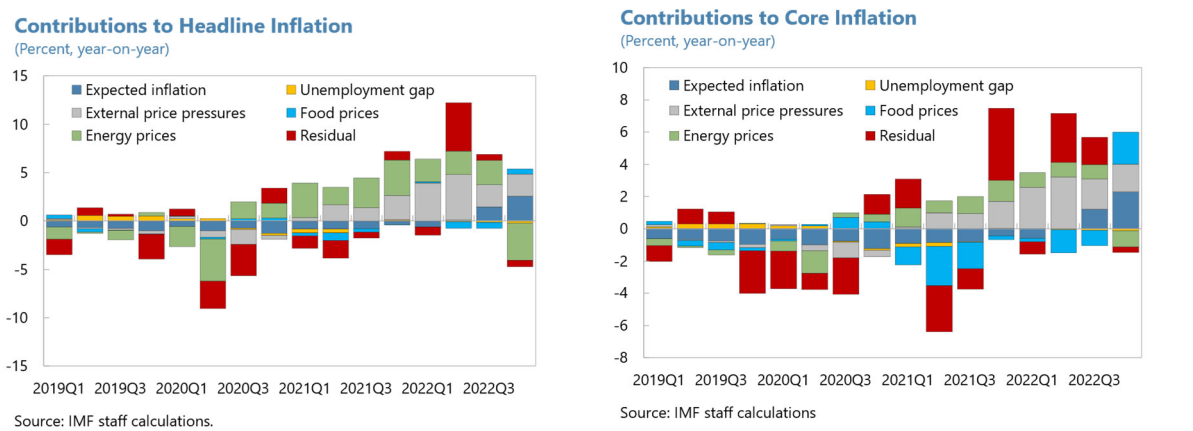
C. Inflation Drivers: Phillips Curve Perspective

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.

Figure 2. A Phillips Curve Perspective

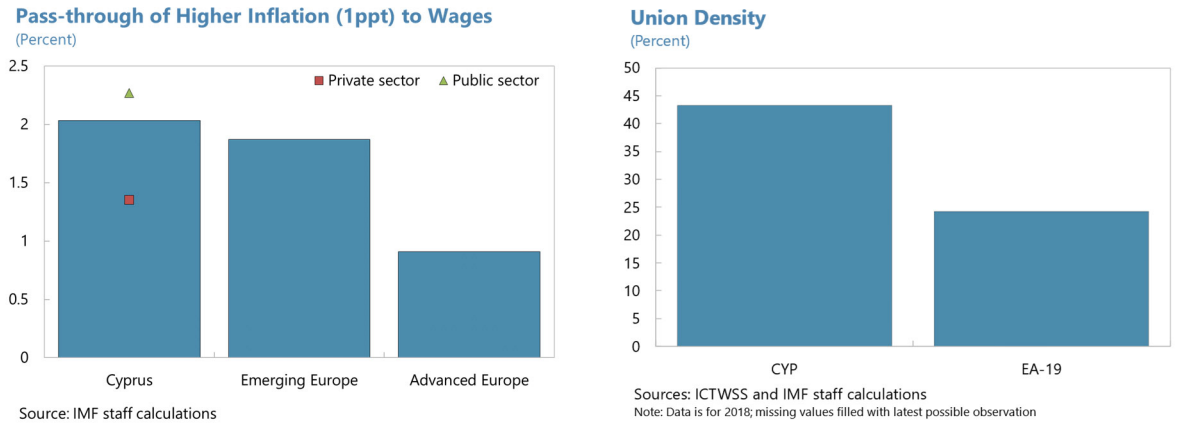


6. Sectoral capacity constraints appear to play a more important role than the aggregate unemployment gap. The unemployment gap turned positive in 2022, but the Phillips curve attributes only a small contribution to overall inflation. This reflects a small coefficient of the gap in the Phillips curve—indicating 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).

Figure 3. Wage Pass-Through of Inflation Shocks



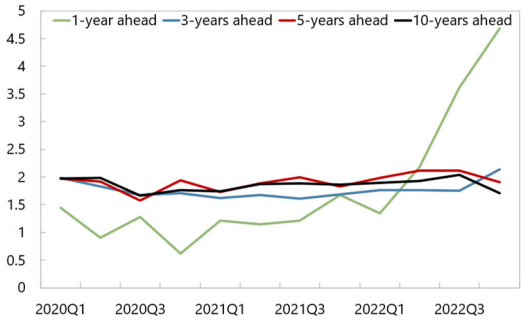
8. Wage pass-through of inflation is strong in Cyprus. The analysis suggests that a 1 percent increase in inflation raises wages in the private sector by 1.4 percent and in the public sector by 2.3 percent (Figure 3, left panel). This is considerably higher than in most advance economies in Europe. Baba 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,

Figure 4. Inflation Expectations from Professional Forecasters
(Percent, year-on-year)

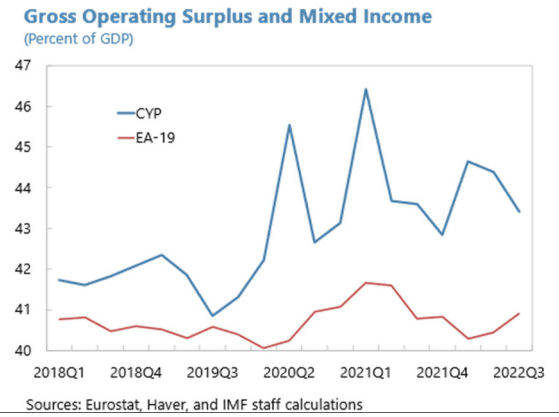


expectations remain well anchored for longer horizons (3-, 5-, and 10-year), providing reassurance that the ECB's inflation goal maintains credibility in the medium-run.

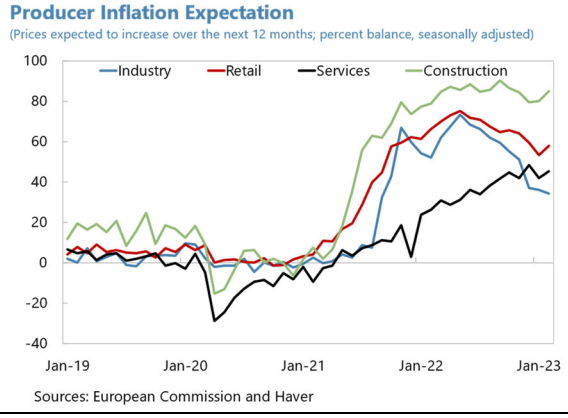
- *Given the historical pass-through, wage pressures are expected to intensify this year, aggravated by labor market tightness.* The unemployment gap is positive and the vacancy-to-unemployment ratio still high. While there were only thirty vacancies per one hundred unemployed in Q1 2019, there were 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).

Figure 5. Profits and Producer Price Expectations



Sources: Eurostat, Haver, and IMF staff calculations



Sources: European Commission and Haver

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 disproportionally 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.

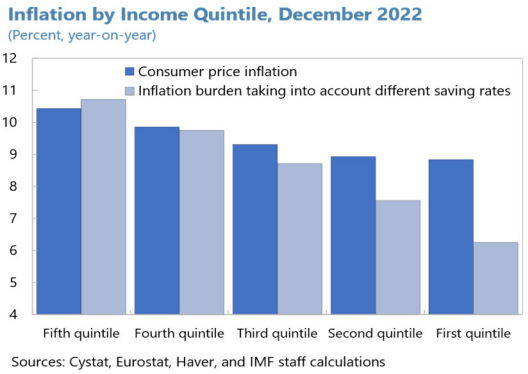
11. Any upwards revisions to the automatic cost-of-living allowance (CoLA) would risk sustaining high inflation and weakening the economy structurally. The current level of the CoLA is set to half of previous year inflation and covers the public sector and unionized employees in the private sector (about ⅓ 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.



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

Other factors aggravate this heterogenous 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.

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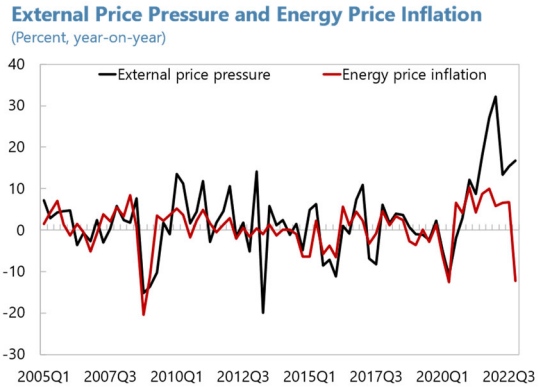
Annex I. Estimation of European Phillips Curves

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:

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

where $\pi_{i,t}$ is the q-o-q annualized inflation rate (either headline or core) in country *i* in quarter *t*, $\pi^{e}_{i,t}$ 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).

Annex I. Figure 1. Selected Coefficients in Europe



Annex I. Table 1. Cyprus: Phillips Curve Regression Results

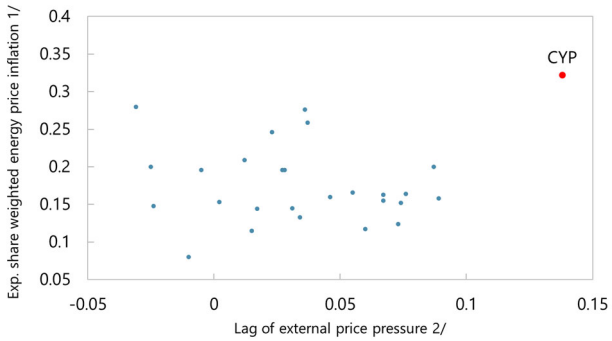
	Core inflation					Headline inflation				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	EUR	EE	AE	CYP	CYP (ygap)	EUR	EE	AE	CYP	CYP (ygap)
Unemployment gap	-0.184***	-0.366***	-0.145***	-0.081	0.113*	-0.302***	-0.620***	-0.189***	-0.232	0.045
	(0.042)	(0.135)	(0.040)	(0.183)	(0.057)	(0.058)	(0.188)	(0.048)	(0.179)	(0.055)
Lag of inflation	0.532***	0.525***	0.540***	0.286**	0.067	0.420***	0.353***	0.529***	0.102	0.279**
	(0.076)	(0.127)	(0.042)	(0.112)	(0.116)	(0.047)	(0.082)	(0.036)	(0.115)	(0.110)
Inflation expectations 1 year ahead	0.468***	0.475***	0.460***	0.714***	0.933***	0.580***	0.647***	0.471***	0.898***	0.721***
	(0.076)	(0.127)	(0.042)	(0.112)	(0.116)	(0.047)	(0.082)	(0.036)	(0.115)	(0.110)
Lag of external price pressure	0.032***	0.061***	0.017***	0.073*	0.140***	0.043***	0.067***	0.020***	0.138***	0.072*
	(0.007)	(0.017)	(0.004)	(0.040)	(0.048)	(0.010)	(0.024)	(0.007)	(0.049)	(0.041)
Food price inflation	0.066***	0.105**	0.030***	-0.051	-0.004	0.100***	0.146***	0.050***	0.008	-0.054
	(0.021)	(0.043)	(0.009)	(0.060)	(0.055)	(0.028)	(0.052)	(0.013)	(0.054)	(0.061)
Lagged food price inflation	0.043***	0.034	0.035***	-0.056	-0.046	0.041**	0.049	0.017	-0.050	-0.055
	(0.014)	(0.026)	(0.010)	(0.069)	(0.064)	(0.020)	(0.038)	(0.014)	(0.065)	(0.068)
Energy price inflation	0.018*	0.032	0.023***	0.082	0.309***	0.160***	0.154***	0.177***	0.322***	0.076
	(0.010)	(0.021)	(0.007)	(0.059)	(0.056)	(0.013)	(0.028)	(0.010)	(0.057)	(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 then 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.

Annex I. Figure 2. Selected Coefficients in Europe



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

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.

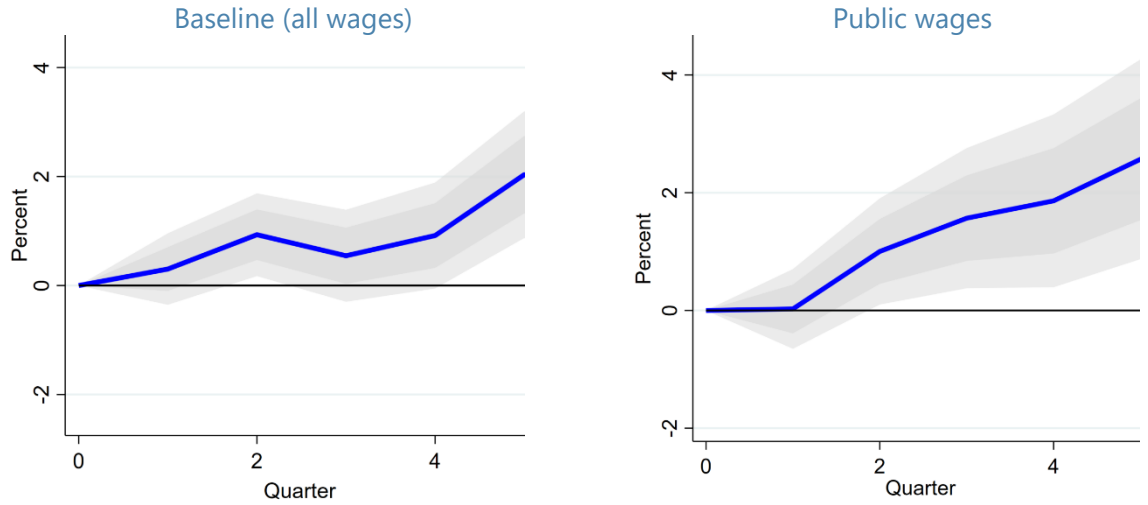
Annex II. Estimation of Wage Response to Inflation Shocks

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,...H, we estimate the following model on quarterly data for Cyprus:

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

where $\Delta_h w_{t+h-1}$ refers to the cumulative growth in wages in *h* quarters from *t-1*, Δw_{t-I} and Δcpi_{t-I} are the quarterly wage growth and CPI inflation rate with a lag of *i*-quarter, and Δy_{t-I} 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.

Annex II. Figure 1. Impulse responses: Wage response to inflation shock



Note: The regressions include four lags for the autoregressive terms, lagged CPI inflation, changes in unemployment rates and changes in NEER. The shaded area represents the 68 and 90 percent confidence bands.
Source: Estimation follows Baba and Lee (2022) with additional data from Cystat.

RESIDENTIAL PROPERTY PRICE DEVELOPMENTS AND (MIS)ALIGNMENTS IN CYPRUS[1]

Residential house prices in Cyprus show no signs of overvaluation in international comparison, and various indicators confirm that prices are aligned with economic fundamentals, even though still-high household debt poses a risk. Regional disparities raise some concerns about affordability, notably in Limassol, calling for supply-side measures to increase housing supply.

A. Introduction

1. Residential property prices rose sharply before Cyprus joined the euro area. The price surge from 2006 until 2008 was among the highest in the euro area, amid strong domestic credit growth and increasing foreign demand, supported by lower exchange rate risks and upbeat economic sentiment due to the approaching euro adoption (Cleanthous et al. 2019). A strong decline of foreign demand due to the global financial crisis had been largely absorbed by rising local demand as credit growth continued, so that prices declined very little until 2012.

2. House prices corrected after the 2012–2013 Cypriot financial crisis and have remained below pre-crisis levels since. When the credit boom ended in 2012, the decline in housing sales accelerated. In 2015, sales amounted to only around a fifth of the peak in 2007 (Coutinho et al. 2018), with sales to non-residents particularly strongly affected (Figure 1, top left panel). By 2015, house prices had fallen by around a third amid low demand and a high housing stock (Figure 1, top right panel). Due to widespread defaults, mortgage NPLs increased sharply, and growth in new housing loans (and in the stock of loans) turned negative, starting a slow process of deleveraging from the very high pre-crisis debt levels.

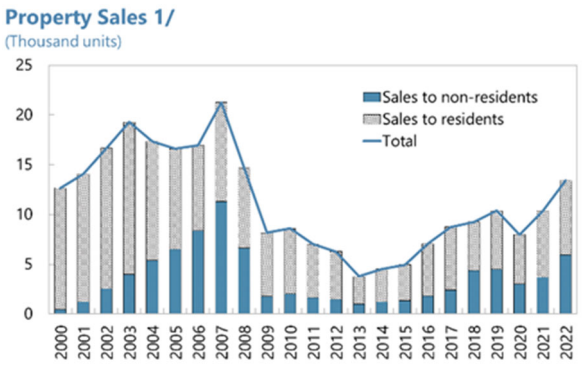
3. Prices started recovering as demand—including foreign—picked up after 2015. Foreign demand was initially driven by the Citizenship by Investment Program (CIP), especially from Russian and later Chinese investors, while domestic demand was supported by a moderate recovery in new mortgage lending (Figure 1, bottom left panel). Housing construction growth also resumed.

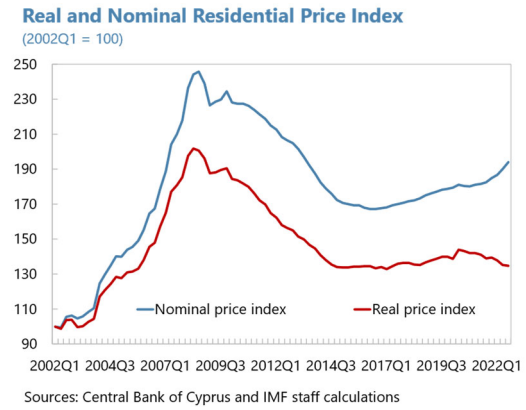
4. After a slowdown in 2020, prices started accelerating. Demand slowed in 2020 as new lending turned negative during the COVID-19 pandemic, and the CIP was terminated, drastically reducing foreign demand. Housing construction stabilized and has not adjusted to the subsequent pickup in new lending and domestic demand, to the sharp increase in foreign demand attributed to the relocation of foreign businesses and their employees (especially in the ICT sector), or to war-related immigration from Russia and Ukraine. Furthermore, construction costs increased (Figure 1, bottom right panel), reflecting supply bottlenecks. Prices accelerated as a result, especially in areas

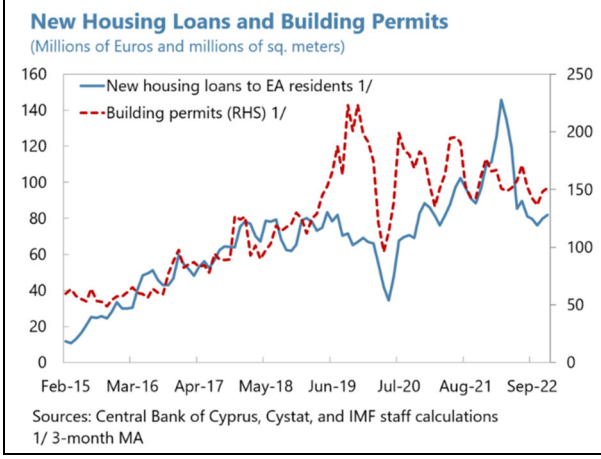
[1] Prepared by Robert Beyer (EUR) and Nina Biljanovska (RES). The analysis benefitted from helpful comments and suggestions by Pietro Dallari, Wojciech Maliszewski, and Mark Horton (all EUR), and participants of a presentation at the Central Bank of Cyprus during the 2023 Article IV mission.

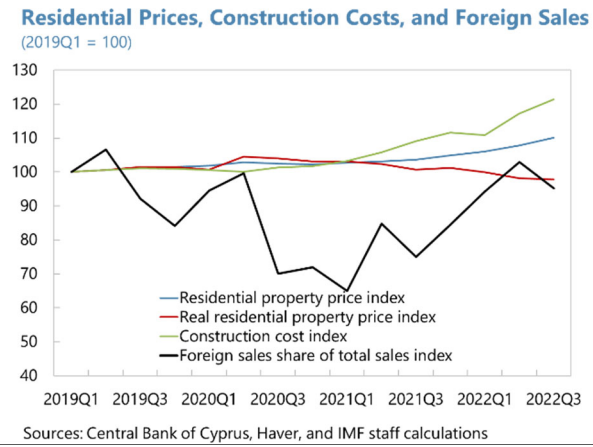
with foreign demand, raising concerns about affordability (even though prices have declined in real terms given high inflation).

Figure 1. House Price Trends









5. The tightening of financial conditions poses risks to the housing market. Tightening financial conditions and the cost-of-living crisis cooled domestic demand; new lending for housing has slowed. Foreign demand continues to be sustained by the same drivers as in 2022, which will likely support prices in local markets with large foreign presence (and which may, in combination with higher borrowing costs, further price out domestic buyers). Separately, the still very high stock of housing debt poses a risk to the market as rising interest rates and economic headwinds impact existing mortgage holders—most mortgages are at variable interest rates—potentially resulting in defaults.

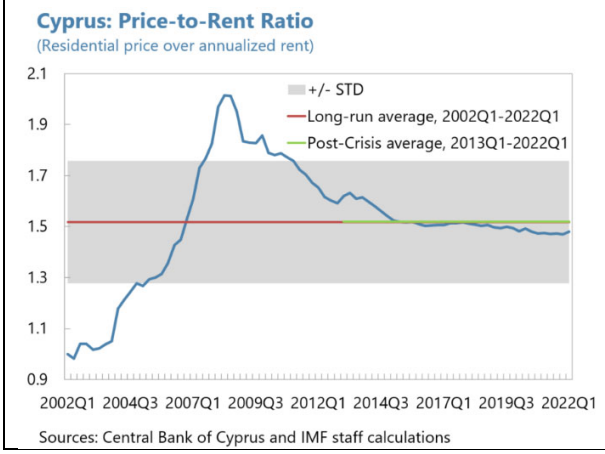
6. Against this backdrop, this Selected Issue Paper aims to address four questions:

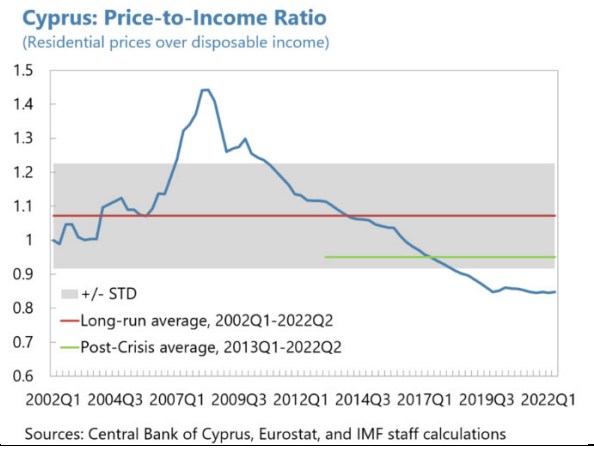
- Are residential house prices misaligned and how do they compare internationally?
- How will rising interest rates impact affordability and price valuations?
- Are local price developments a reason for concern?
- If anything, what should policy makers do?

B. House Price (Mis)alignments

7. Standard measures of price misalignments stand at or below historical averages. Two statistical measures often consulted are the Price to Income Ratio (PIR) and the Price to Rent Ratio (PRR), which can be interpreted as reduced forms of inverse demand and user-cost modeling approaches, respectively (Duca et al. 2021). In Cyprus, both ratios peaked in 2008 and have since declined, remaining at or below the long-time average during and after the COVID-19 pandemic. Moreover, they are both below their post financial crisis averages, hence indicating no signs of overvaluation (Figure 2).

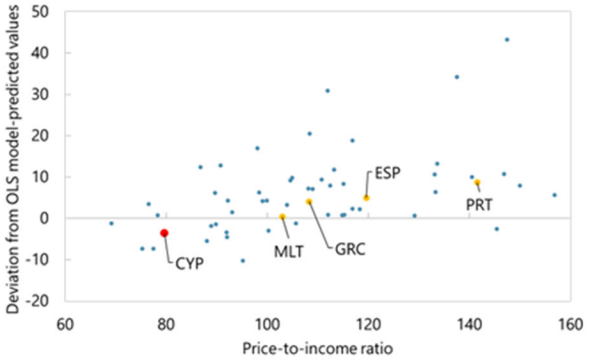
Figure 2. Price-to-Income and Price-to-Rent Ratios





8. Cross-country comparisons similarly indicate that house prices in Cyprus are not overvalued. We assess house price valuations in Cyprus against valuations in over 50 countries during the second quarter of 2022 based on two indicators. First, we compare PIRs and, second, we compare actual prices to predictions from a cross-country Ordinary Least Squares (OLS) regression model. The OLS model considers a large set of explanatory variables, which are proxies for fundamentals driving house prices (for more details on the model specification, see Annex A). Deviations of prices from the model prediction are thus interpreted as signaling misalignment. Neither measure places Cyprus among countries with overvalued house prices (Figure 3).

Figure 3. House Prices in International Comparison
(Percent, 2022Q2)



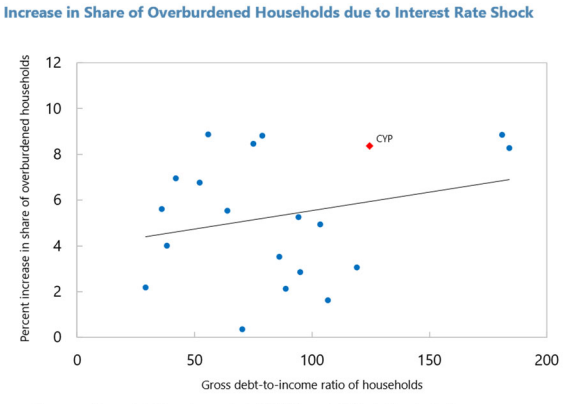
Sources: BIS, OECD, Haver, and IMF staff calculations

C. Debt Vulnerabilities and Rising Interest Rates

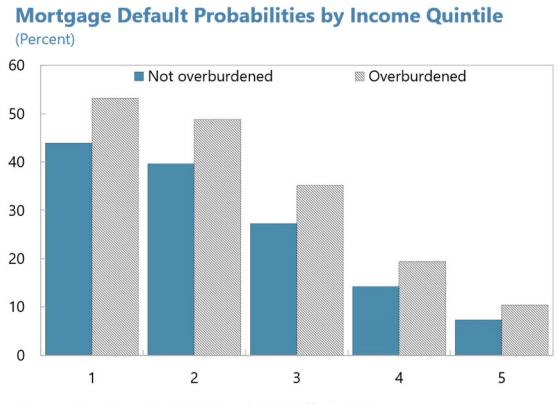
9. Housing debt—a crucial driver of house prices—has not exhibited unsustainable dynamics associated with the previous crisis. The OLS regression used for the international comparison relates changes in prices to changes in explanatory variables as proxies for market fundamentals, but these variables may exhibit unsustainable dynamics themselves (potentially jointly with housing prices). For instance, while a self-reinforcing dynamic between housing prices and credit could be a stable equilibrium (as higher collateral values increase households' ability to borrow and motivate banks to lend more—Anundsen and Jansen 2013), twin booms in house prices and credit growth are also likely to end up in severe banking crisis (Cerutti et al., 2015). Cyprus experienced a twin boom in 2007, with growth of both residential prices and credit accelerating by more than two standard deviations and prices rising further until ultimately collapsing after the 2012-13 financial crisis. Importantly, household credit has been shrinking in recent years (as households have been deleveraging since the crisis), and hence credit developments do not appear to have contributed to unwarranted housing price growth.

10. But the level of housing debt is still high, posing a risk to the market given the headwinds (Figure 4)**.** One way to look at the risk associated with high debt under rising interest rates and the cost-of-living crisis is to identify households that are now 'overburdened' and thus more likely to default on their mortgages. An econometric simulation based on household level data (Topalova et al. 2023) defines households as overburdened if mortgage payments and essential consumption (food, utilities) exceed 70 percent of their gross income. The results suggest that more than half of households holding a mortgage—concentrated at the lower end of the income distribution—could now become overburdened. These mortgages account for about 70 percent of total mortgage debt—much higher than the EU average. However, as significant share of housing debt has already been non-performing since the crisis, the impact will depend on how the legacy NPLs are resolved (and underlying collateral disposed in some cases) by banks and credit acquiring companies (CACs; now holding the bulk of this portfolio).

Figure 4. Overburdened Households and Default Probabilities



Sources: Eurostat, Topalova et al. (2023), and IMF staff calculations

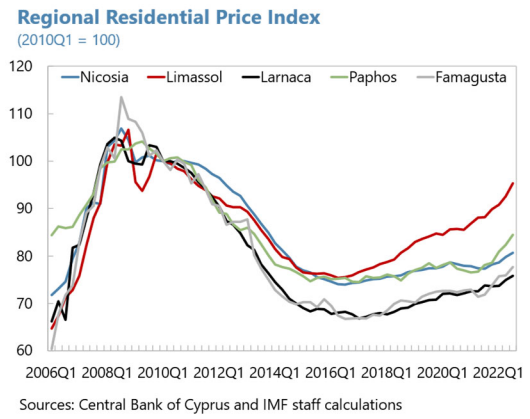


Sources: Topalova et al. (2023) and IMF staff calculations

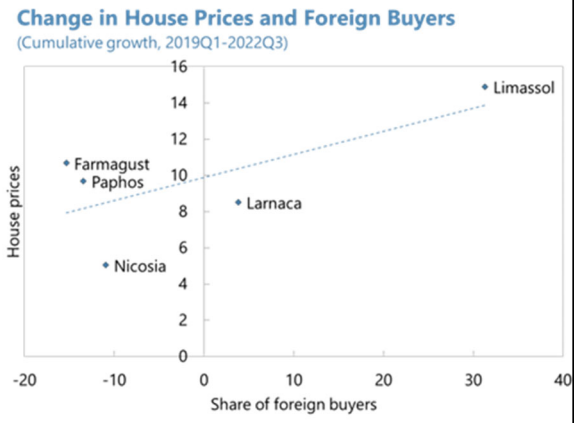
D. A Regional Perspective

11. House prices in the Limassol region of southern Cyprus have been rising faster than in other areas. Since 2016, prices in Limassol decoupled, outperforming other areas (Figure 5, top left panel). Initially, this development was disproportionally affected by foreign demand driven by the CIP. However, price growth did not slow after the termination of the scheme in November 2020. Even after Russia's invasion of Ukraine, prices in Limassol did not fall—as many expected at that time—but instead accelerated, reaching 15 percent in nominal terms since 2019Q1. This has been driven by robust domestic demand and again rising foreign demand (by about30 percent from 2019Q1 to 2022Q4)—likely due to the concentration of new immigration from Russia and Ukraine and an influx of companies and employees in the ICT sector in this region. Overall, foreign demand appears to be an important driver of regional disparities in real estate developments in Cyprus (Figure 5, top right panel).

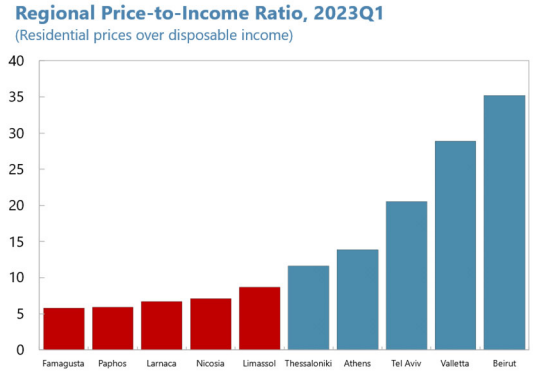
Figure 5. Regional Differences in Housing Markets



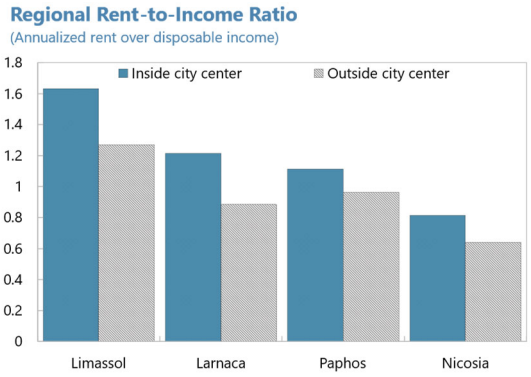
Sources: Central Bank of Cyprus and IMF staff calculations



Sources: Central Bank of Cyprus and IMF staff calculations



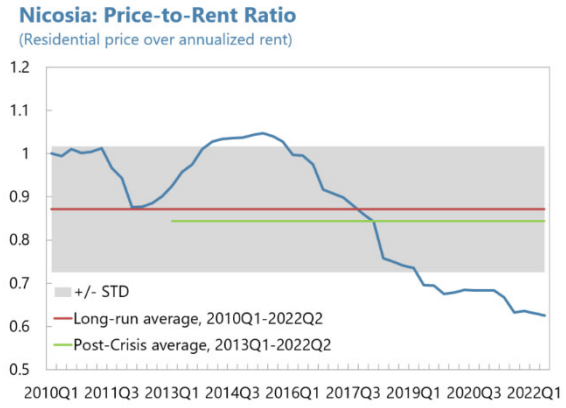
Source: Numbeo

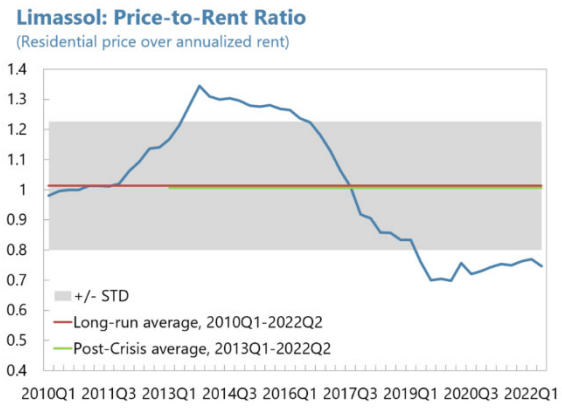


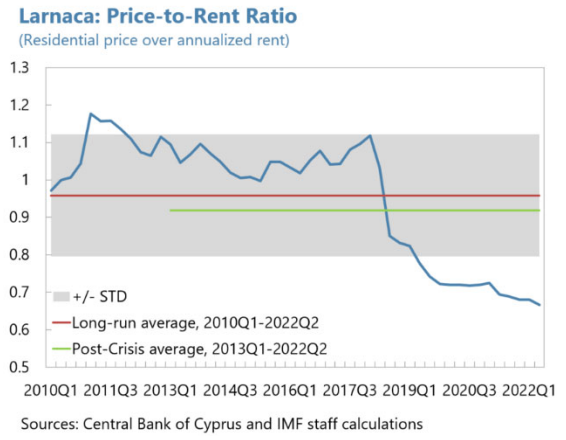
Source: Numbeo

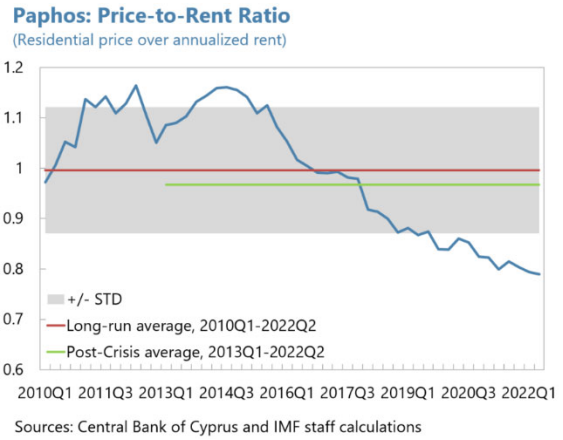
12. PIRs confirm that affordability is lowest in Limassol, but prices remain low in cross-country comparisons. Price to income ratios from Numbeo (2023) unveil that the PIR in Limassol was around a fifth higher than in Nicosia and around a third higher than in Larnaca, Paphos, and Famagusta. However, in cross-country comparisons, affordability in Cyprus, including in Limassol, is much better than in other cities in the region (Figure 5, bottom left panel). In Thessaloniki and Athens, for example, the PIR is around twice as high. In Tel Aviv, Valetta (Malta), and Beirut, the PIRs are even higher. Despite some uncertainty about the reliability of these numbers, this comparison suggests that cities in Cyprus remain relatively affordable and attractive destinations for foreigners. Time series of PRRs unveil that they are below long-term averages in all areas, including in Limassol (Figure 6).

Figure 6. Regional Price-to-Rent Ratios









13. Regional disparity is somewhat larger for rents. In line with house prices, rents are the highest in Limassol (Figure 4, bottom right figure). According to data from Numbeo (2023), the rent-to-income ratio in Limassol is a fourth higher than in Larnaca, a third higher than in Paphos, and a half higher than in Nicosia, where the rents are relatively cheap compared to prices. These

differences are very similar whether comparing rents inside the city center or outside of it. From a rental affordability perspective, the areas of concern are hence Limassol and, to a lesser extent, Larnaca.

E. Conclusion and Recommendations

14. Although various indicators suggest that housing market prices are not deviating from fundamental values, there are still some risks. Despite rising mortgage rates and a high share of flexible mortgages and vulnerable households, the risk of a large housing market correction seems low, especially if foreign demand continues to be boosted by immigration. Yet, despite progress in improving banks' resilience, the potential impact of financial tightening on credit quality and collateral revaluation risks calls for enhanced monitoring, especially because private debt levels are high compared to other countries. The resolution of legacy NPLs can reduce vulnerabilities and should advance decisively, supported by an unperturbed implementation of the foreclosure framework and the planned Mortgage-To-Rent scheme (which will help advance the resolution of NPLs from vulnerable borrowers). Intensifying concerns about price developments in specific segments could necessitate a macroprudential response, like the recent tightening of the Loan-to-Value ratio for luxurious properties.

15. Supply side measures could help address affordability constraints. Emerging housing constraints in Limassol are best resolved by market forces. However, policy makers could support housing supply and new construction, for example by reinstating the immovable property tax (IMF 2021)—which has been shown to reduce prices both in the short- and long-run in OECD countries (Oliviero et al. 2019)—or by strategic rezoning.

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Annex I. A Global OLS Model for International Comparison

1. The benchmark regression model takes the following form:

$$House\ price\ growth_t = C + \theta\ affordability_{t-1} + \beta_1 income\ growth_t + \beta_2\ credit\ growth_t + \beta_3\ real\ interest\ rate_t + \beta_6\ population\ growth_t + \beta_7\ global\ financial\ crisis\ dummy + \beta_8\ COVID\ dummy + \epsilon_t.$$

It is estimated at the country level with the estimation period depending on data availability. Housing affordability is ratio of housing prices to disposable income or to GDP per capita (where disposable income is unavailable); a higher ratio signals less affordability.

2. Since the model is estimated in growth rates, the prediction of the fundamental value requires a transformation into a price level. For the level prediction, house prices from 2014 to 2018 are used as alternative base years and predictions based on these years are then averaged.

3. We use data from different sources: quarterly house price data is from the BIS, quarterly GDP, GDP per capita, and disposable income is from the IMF World Economic Outlook, the quarterly short-term interest rate is from the IMF International Financial Statistics, the annual working age population is from IMF World Economic Outlook, and the quarterly non-financial private sector credit is from the BIS.

4. The above specification is tailored to Cyprus's data. We estimate the following prediction model for Cyprus (with the stars showing conventional levels of statistical significance: *** p<0.01, ** p<0.05, and * p<0.1):

$$House\ price\ growth_t = 0.395^{***} - 0.087^{***}\ affordability_{t-1} + 0.410^{**}\ income\ growth_t + 0.067^{*}\ credit\ growth_t + 0.367^{*}\ population\ growth_t + 0.027^{***}\ global\ financial\ crisis\ time\ dummy - 0.002\ COVID\ dummy - 0.551^{**}\ COVID\ dummy \times income\ growth_t + \epsilon_t.$$

5. The model predictions from the benchmark model and the model adjusted for Cyprus are very similar. For 2022Q2, the deviation from the former prediction was -2.4 percent, while it was -3.6 percent from the latter.