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Inflation in Portugal, Recent Trends, Drivers, and Risks

Kamil Dybczak and Ippei Shibata

SIP/2023/044

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Prepared by Kamil Dybczak and Ippei Shibata

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ABSTRACT: This paper examines recent trends, main drivers, and risks to near-term inflation in Portugal. Before the energy crisis, inflation in Portugal was low, often below the Euro Area average, but it accelerated quickly in the second half of 2022. Our estimated Phillips curve regression suggests that, similarly to other Euro Area countries, inflation in Portugal has been largely driven by food and external prices pressures. Inflation is projected to gradually decrease, reflecting receding energy prices and anchored inflation expectations. However, uncertainty remains high and inflation could remain elevated, especially if the inflationary process became backward looking or wage-inflation spirals are induced by pressures from energy prices.

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SELECTED ISSUES PAPERS

Inflation in Portugal, Recent Trends, Drivers, and Risks



PORTUGAL

SELECTED ISSUES

June 1, 2023

Approved By
Rupa Duttagupta

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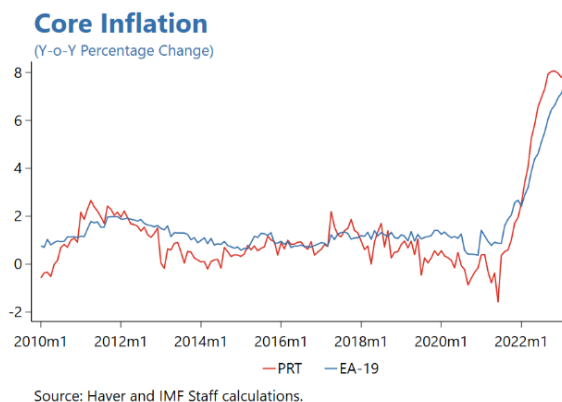
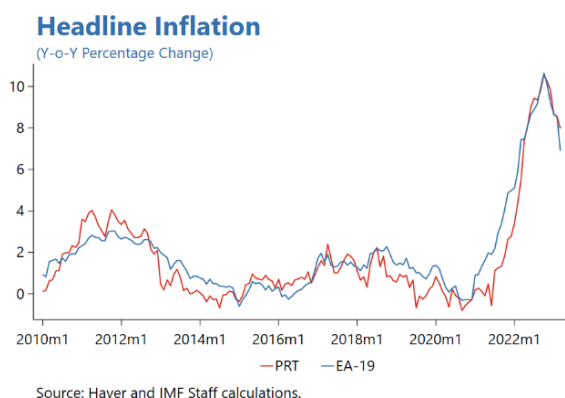
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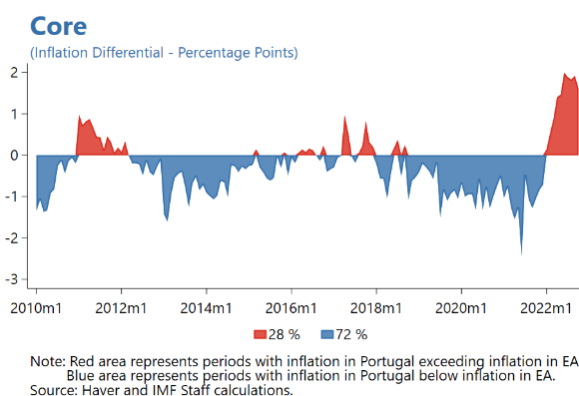
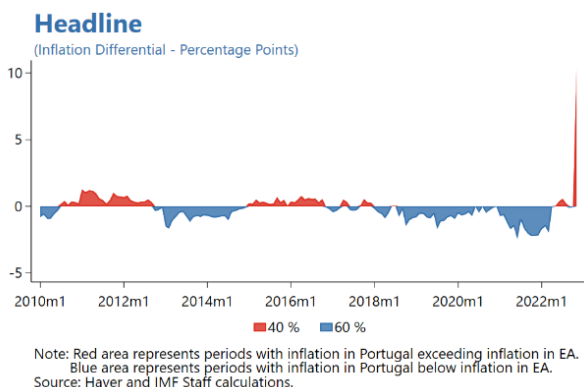
INFLATION IN PORTUGAL, RECENT TRENDS, DRIVERS, AND RISKS¹

A. Stylized Facts

1. Before the recent energy crisis, inflation in Portugal was relatively low. For the most part of the last decade, headline and core inflation hovered below 2 percent. A disinflation trend was present in some of the components of the harmonized index of consumer prices (HICP, Annex I).²



2. While below average euro area (EA) levels, inflation has been strongly correlated with the rest of the EA. Since 2010, until the energy crisis, Portugal’s headline and core inflation were below the EA level more than half the time, mostly driven by non-energy industrial goods such as clothing and footwear. These trends continued during the Covid pandemic, partly reflecting an almost 10 percent decline in tourism-related prices—e.g., transport, and hotels, cafés, and restaurants— and higher weight of these items in Portugal’s HICP basket, resulting in Portugal’s inflation falling further below the EA level (Annex II).



¹ Prepared by Kamil Dybczak and Ippei Shibata

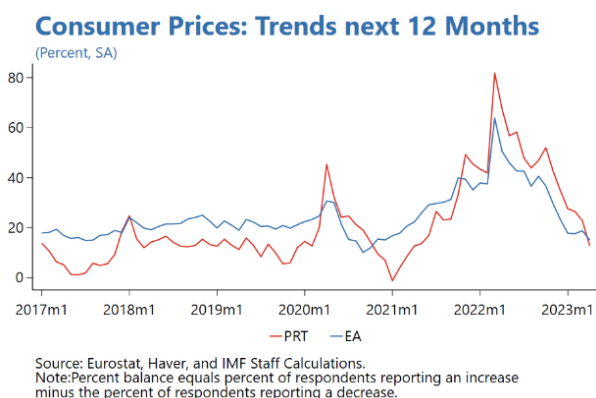
² We define core inflation as headline inflation excluding energy and unprocessed food prices.

3. However, the inflation differential with the EA cannot be fully explained by differences in weights of individual HICP items. The structure of Portugal's HICP basket is similar to those in other EA countries and the weights are broadly comparable across countries, despite some differences (Annex III). For example, the weight of food and non-alcoholic beverages in Portugal's HICP basket has been above the EA level since 2012 (at over 20 percent), while the weight of housing, water, electricity, and gas represents 10 percent in case of Portugal, it is 16 percent for the EA. Despite all these differences, assuming the average EA weights were imputed to Portugal, inflation in Portugal would be only about 0.2 pp above its actual level in 2021 and 2022.³

4. Inflation picked up slowly in 2022H1, reflecting delayed passthrough from international commodity prices to headline, but accelerated quickly in 2022H2. The passthrough from rising energy prices (between end 2021 to early 2022) to Portugal's prices was less pronounced than in average EA country (about 9 percent increase y/y in Portugal compared to about 47 percent for EA in March 2022). This mainly reflected policy measures, such as the reduction in network access tariffs and other policies (tax exemptions on fuel excises and VAT, and the Iberian price cap were announced in mid-2022 and came into effect in H2). Eventually, headline inflation accelerated and after peaking in October 2022 (10.6 percent y/y), it has been on a gradual downward path. In contrast, core inflation exceeded EA level in early 2022, and has hovered around 8 percent since September 2022, pointing to a stickier and more entrenched inflationary path.

5. Consumer price expectations have followed trends similar to those in headline inflation,⁴ picking up from early 2021, and eventually exceeding EA averages by end-2022. They started declining during 2022H2, keeping risks of second round effects from the initial commodity price shock well contained.

6. The rest of this note analyzes drivers of price dynamics through the lens of a Phillips curve estimation. The analysis provides a model-based forecast of headline and core inflation using assumptions from the January 2023 WEO and conducts sensitivity assessment, including the evaluation of risks of developing a sustained wage-price inflation spiral under current circumstances.



³ Based on calculations using main twelve HICP subgroups.

⁴ Inflation expectations are proxied by the difference between the share of households expecting prices to increase and households expecting prices to decrease over the next 12 months. Higher share of households expecting prices to increase indicates higher inflation expectations, and vice versa.

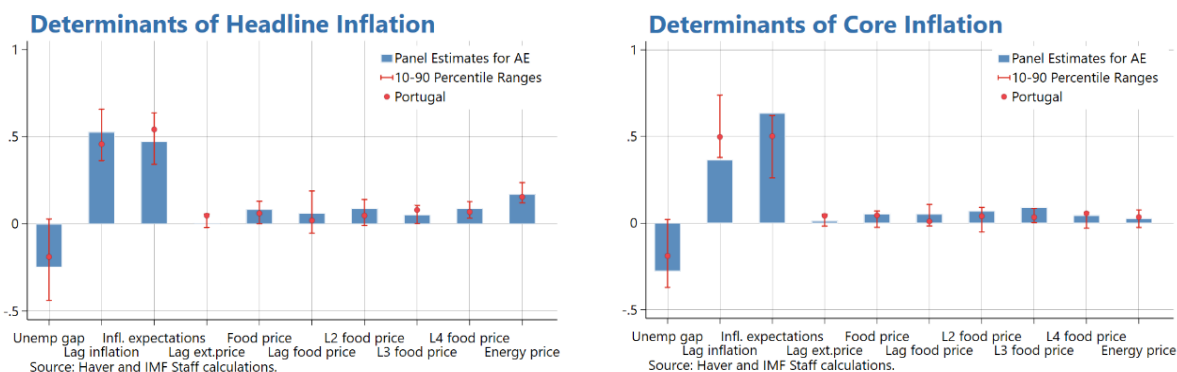
B. Drivers of Inflation - The Phillips Curve

7. We examine the drivers of the recent surge in inflation in Portugal and predict its likely path by estimating a standard Phillips curve equation which relates inflation to its past and future expected values, economic slack, and foreign price developments. After removing seasonality from the data, we estimated the following functional form:

$$\pi_t = \beta_1\pi_{t-1} + \beta_2\pi_t^e + \beta_3y_t + \beta_4Energy_t + \beta_5Food_t + \beta_6External_t + \varepsilon_t \quad (1)$$

where, π_t represents actual headline or core inflation in terms of q/q annualized growth rates. Expected inflation (π_t^e) and slack (y_t)—proxied by the unemployment gap⁵—represent domestic drivers of inflation. Energy ($Energy_t$) and food ($Food_t$) prices—expressed in domestic currency and weighed by the share in HICP basket—and other external price pressure ($External_t$)—proxied by a sum of weighted import producers' prices—represent mostly global price developments. Furthermore, equation (1) is expanded by lagged proxy of external price pressures and lagged food prices to allow for longer passthrough to domestic prices.⁶ The Phillips curve is estimated and examined over 2000: Q1 to 2022: Q4 for 27 advanced economies, including Portugal.⁷

8. Inflation in Portugal is determined by similar factors as in other AE countries. The relationship between slack and headline and core inflation is negative and significant for both Portugal and AE (and of similar magnitude). The role of both backward-Inflation and forward-looking expectations is also comparable to the AE countries, as is the passthrough of food prices and external price pressure (although the coefficients are smaller for both).



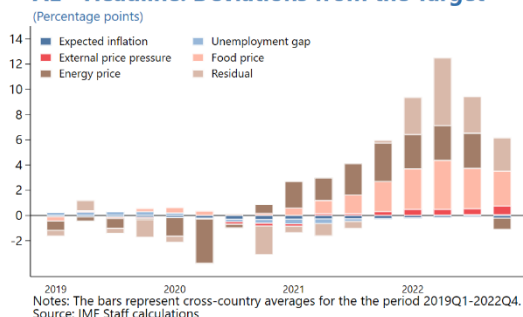
⁵ Unemployment gap estimates and forecast were provided by IMF country teams (January 2023 WEO). Other proxies of slack, including the output gap, were used as robustness checks, and did not materially change the thrust of the results.

⁶ The choice of the number of lags follows Baba et al (2023) reflecting the empirical regularities uncovered in the data.

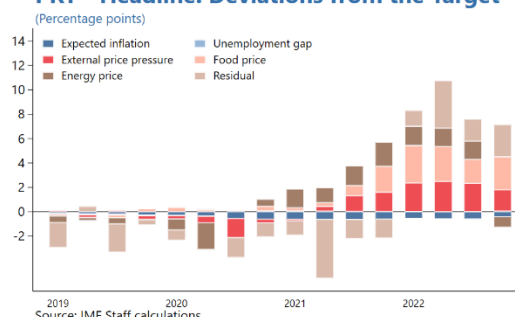
⁷ The analysis is conducted separately for both headline and core inflation for Portugal and a set of advanced European countries including: AUT, BEL, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, IRL, ISL, ISR, ITA, LTU, LUX, LVA, MLT, NLD, NOR, PRT, SVK, SVN, and SWE.

9. While food and external price pressures contributed the most to Portugal’s inflation in 2022, a significant part of inflation cannot be explained by conventional inflation drivers. To account for the exceptional size of price changes in 2022, following Baba et al (2023), we quantify dynamic contributions of each driver of inflation from the Phillips curve. Explaining about ¾ of Portugal’s inflation, the model performs slightly better than in the case of the group of AE countries, in which case it explained at most 60 percent. The contribution of food and external prices pressures dominated inflation dynamics in Portugal in 2022, representing about 3.5 pp and 2.5 pp of headline inflation, respectively. While the contribution of food prices to overall inflation seems comparable in Portugal and other AEs, the contribution of external price pressures is significantly larger for Portugal, likely reflecting Portugal’s reliance on imported inputs as a small open economy. The contribution of energy prices in Portugal is estimated to be below the average of AE countries, reflecting domestic energy price policies and the lower weight of energy in Portugal’s HICP basket. The Phillips Curve accredits only a small impact to the unemployment gap on overall inflation in case of the AE and almost no impact for Portugal. Finally, despite inflation expectations started picking up since 2021, they remained anchored and have driven inflation in the opposite direction than the remaining factors since 2022H2.

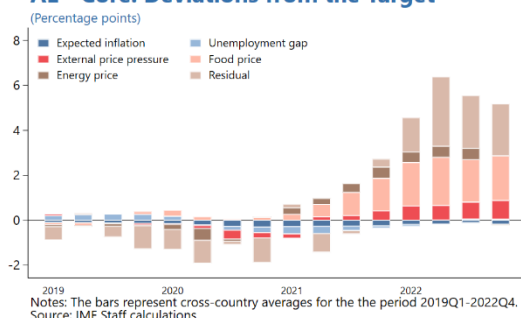
AE - Headline: Deviations from the Target



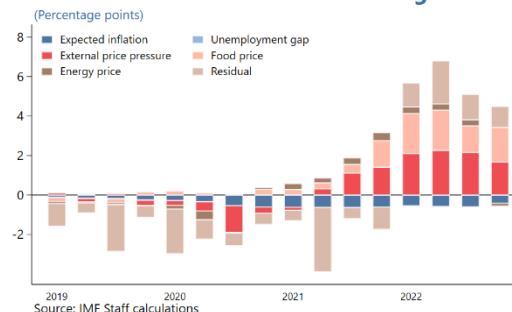
PRT - Headline: Deviations from the Target



AE - Core: Deviations from the Target

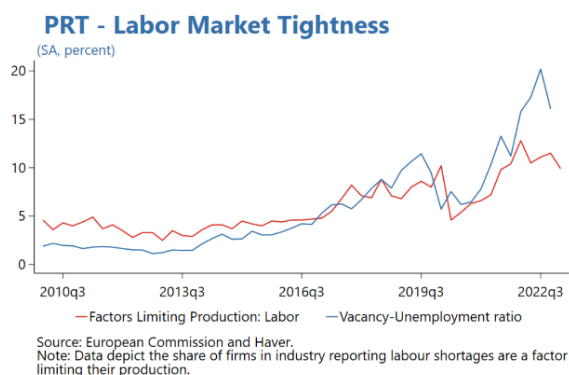


PRT - Core: Deviations from the Target



10. Several factors may account for the rise in unexplained inflation. The unexplained part of inflation increased in 2022, but more in AE countries than in Portugal. This could result from the inability of the model to capture possible non-linear impact of the exceptionally large commodity price changes and/or an alteration of the inflation process due to the pandemic and Russia's war in Ukraine.⁸ In addition, the commonly used indicators used in our analysis may not fully capture inflation drivers or increase in spillovers between inflation components after the pandemic (see Quelhas and Serra (2023)). While these factors seemed to have affected all European countries in a similar way—as reflected in the consistently positive Phillips curve residuals in the last few quarters—country-specific factors could have also played a role:

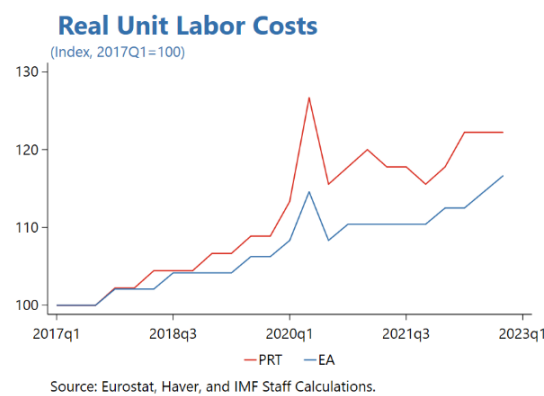
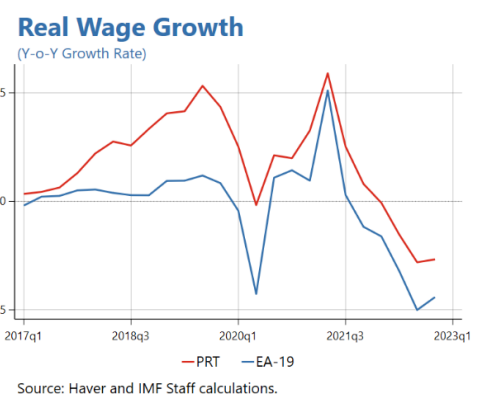
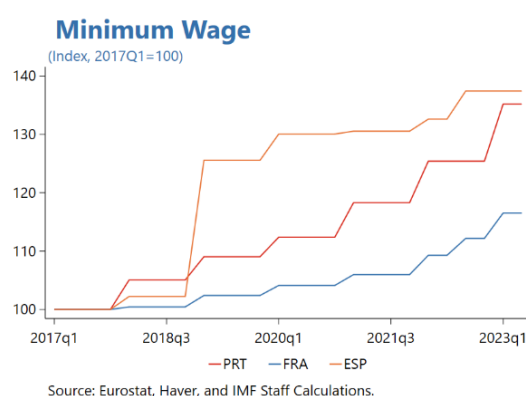
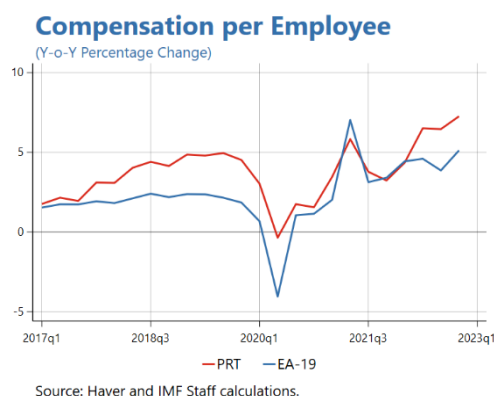
- a. *Labor market tightness* – Despite the recent pick up, the unemployment rate in Portugal remains below pre-pandemic level and below the estimated equilibrium unemployment level, resulting in a negative unemployment gap. Moreover, labor market tightness in Portugal might have increased even more than indicated by the unemployment gap, which would be in line with a growing share of job vacancies per number of unemployed and growing share of firms reporting labor shortages as a factor limiting production.
- b. *Administered prices* – To mitigate rising commodity prices and postpone passthrough to other prices, many European countries introduced specific tax and regulatory measures (such as price caps or freezes). Countries with a higher share of administered prices experienced slower changes in inflation in 2022, though often at sizable fiscal costs. In Portugal, it has been estimated that the Iberian cap protected Portuguese consumers by reducing electricity prices by about 16 percent (Schlecht et al (2022)).
- c. *Wage growth* – For most of the time since 2017, wages⁹ in Portugal have grown above the EA average, and typically above inflation and productivity levels. Wage growth receded during the pandemic, but less sharply than the EA. Conversely the post- energy crisis increase in nominal wages has outpaced EA average, in part reflecting developments in the minimum wage. Nonetheless, wage growth has been relatively contained so far, as nominal wages increased less than headline inflation (6.1 percent and 8.1 percent in 2022, respectively). As such, real wages rose in the first half of 2022 but fell in the second half of the year, as soaring inflation outpaced wage growth.



⁸ To test stability of estimated coefficients and explore possible structural shifts, Baba et al (2023) estimate Phillips curves on a rolling basis using panel data for 28 countries over 16 quarters. Their estimates point to possible shifts in the Phillips curve coefficients in the post-pandemic period, suggesting that inflation may have become more backward-looking.

⁹ Wages are approximated by the compensation of employees, which also includes non-wage costs besides wages.

- d. *Tourism* — a strong pickup in tourism-related prices (e.g. hotels and restaurants) in Portugal (13 percent vs 7 percent for EA average) contributed to higher inflation since the end of the pandemic.



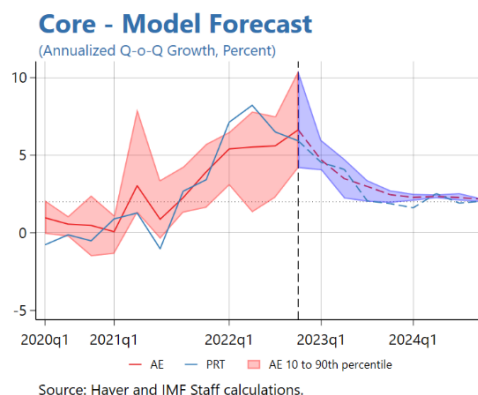
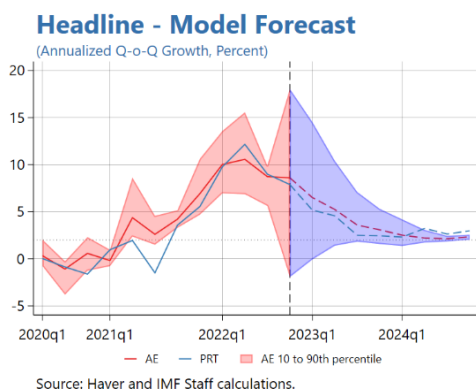
C. Inflation Projections

11. Inflation in Portugal and other AEs is projected to decline gradually in 2023 and 2024.

The empirical model based on the Phillips curve—drawing on the estimation from the previous section—would predict headline and core inflation in Portugal and the AE countries to decline to about 2 percent by the end of 2024, reflecting larger slack, lower energy prices and lower external price pressures. In the short run, falling commodity prices would mainly benefit headline inflation and impact core inflation only through the second-round effects with some lag. Staff’s baseline inflation forecast as of March 2023 also assumes both headline and core inflation to decline over the projection horizon, though in a more gradual manner—reaching the 2 percent target only after 2025—taking into account factors not reflected by the model, such as the minimum wage growth, and labor market tightness.¹⁰ Similarly, the inflation forecast by Banco de Portugal as of March 2023 assumes slower convergence of inflation towards its target than suggested by the empirical model, reaching 2 percent in the course of 2025.¹¹

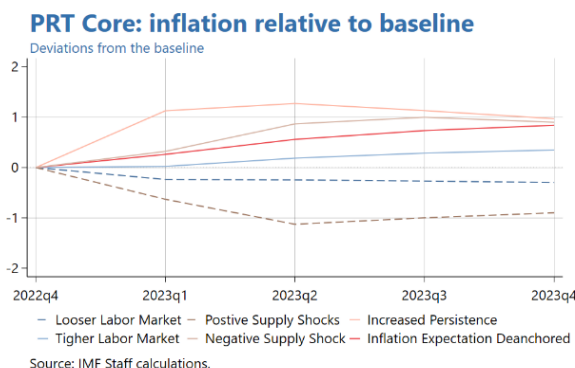
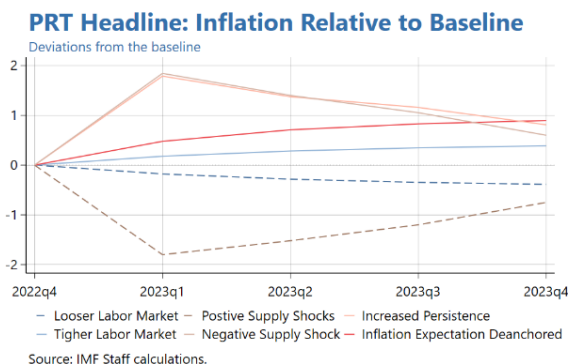
¹⁰ International Monetary Fund (2023) World Economic Outlook, March 2023.

¹¹ See Banco de Portugal (March 2023) “Projections for the Portuguese economy: 2023-25”



12. Despite the favorable outlook for commodity prices, the predicted inflation deceleration remains uncertain and could be slower than expected. Assuming the inflation forecast errors of 2022 will fade away over time, the model prediction could underestimate near-term inflation rates. In addition, persistent supply-side bottlenecks and elevated commodity prices together with continued inflation surprises may de-anchor inflation expectations or prompt workers to demand higher inflation-related wage compensation, which may potentially trigger wage-price feedback loops and make the overall inflation process more backward-looking and persistent. In addition, the decline in actual inflation rates could be slowed as measures initially dampening commodity price passthrough are gradually phased out. On the other hand, if global economy slows more than expected, it may translate into larger slack and further sliding commodity prices.

13. Simulations to analyze the effect of such potential risks suggest that inflation could increase further with shocks but would remain on a downward trend under most scenarios. Despite the uncertainties surrounding the model forecast, inflation is projected to continue a downward trend even under alternative scenarios. For instance, if the unemployment gap (slack) decreases/increases by 2 pp, headline and core inflation would increase/decrease by about 0.5 pp over next four quarters. Similarly, a temporary de-anchoring of inflation expectations (higher by 1 pp) would elevate headline and core temporarily by some 1 pp over the next 4 quarters. On the other hand, the impact of 20 percent higher/lower energy and food prices would increase inflation by 1 to 2 pp in case of headline and less than 1 percent in case of core inflation. The most challenging situation would be if the inflation formation process becomes more backward-looking. Increasing the coefficient on past inflation in the Phillips curve to 0.8 (level observed pre-1990), headline inflation would increase by about 2 pp and core by about 1 pp, but the effect would dampen over time as long as inflation expectations do not get impacted.



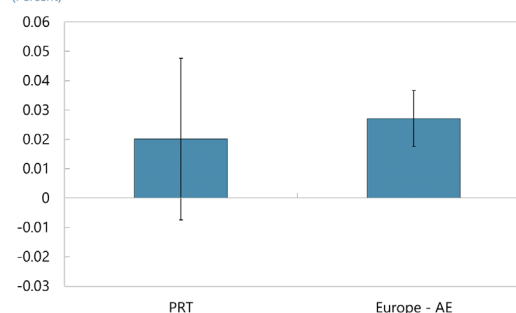
D. Is There a Risk of a Wage-Inflation Spiral?

14. Recent literature suggests that the risk of sustained wage-price spirals, while prevalent, is contained so far in advanced economies. Wage dynamics in advanced economies (AEs) appear to be mostly driven by labor market conditions and inflation expectations but not by the past inflation (Alvarez et al ,2022). In a historical analysis of 79 wage-price spiral episodes, the authors identify 29 episodes that are similar to the ongoing inflation episode. These episodes have the following characteristics: i) increasing year-on-year inflation, ii) positive nominal wage growth, iii) negative real wage growth, and iv) flat or falling unemployment. The authors find that these events did not tend to be followed by sustained wage-price spirals. In fact, inflation and nominal wage growth on average tended to stabilize in the quarters following the wage-price spiral, leaving real wage growth broadly unchanged. In another study, Baba and Lee (2022) estimate the passthrough of oil prices to nominal wages using a cross-country database of European countries since 1960s. The authors find that oil prices have typically not generated wage-price spirals. In response to a 10 percent oil price shock, wages tend to increase by 0.3 percent over three years and then stabilize. However, the passthrough of oil prices to wages is more than twice as high when underlying inflation already exceeds 4 percent, suggesting that there is a risk that the ongoing high inflation episode could increase the passthrough to wages more persistently.

15. An empirical analysis of passthrough of inflation to wages suggests a relatively low risk of an extended wage-price spiral in Portugal.

Following Baba and Lee (2022), we estimate the passthrough from inflation to wage inflation for European advanced economies and Portugal between 2000 and 2019. We consider two specifications: in the first specification, we regress wage inflation on the past four quarters of oil price inflation while controlling for the past four quarters of wage inflation, quarterly changes in unemployment rates and nominal effective exchange rates. Oil price developments, which are globally determined, are assumed to be exogenous in the specification. In the second specification, we regress wage inflation on the past four quarters of inflation while using oil price inflation now as

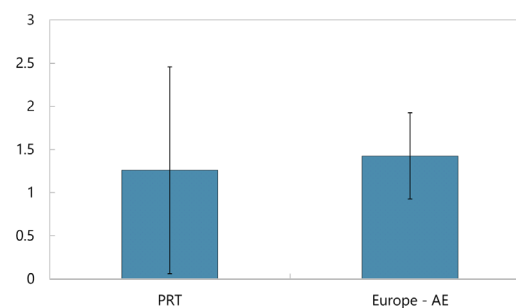
Specification 1: Peak Impact of Oil Price Shock on Wage Inflation (Percent)



Sources: Baba and Lee (2022), Haver Analytics, and IMF staff calculations. Note: Error bars show 90% confidence interval.

an instrument for the past inflation, while keeping the rest of variables unchanged from the first specification. In the first specification, while statistically not significant, the estimated coefficients on the lagged inflation over the local projection horizon suggest that a 1 percent increase in oil price raises wage growth by 0.02 percentage points (peak value) in Portugal during the first year. For Advanced economies in Europe, the estimated coefficient is 0.03 percentage points during the first year. The impact of higher oil prices on wages dissipates fully over the year and at a somewhat faster pace in Portugal compared to other European Advanced economies. Considering that oil prices have risen by some 65 percent in 2021 and 40 percent in 2022, this would imply some 1.3 and 0.8 percentage point increase in the wage growth in 2021 and 2022 respectively, *ceteris paribus*. Based on the second specification, a 1 percentage point increase in inflation caused by the oil price shocks is associated with a peak wage growth of 1.2 percentage point for Portugal during the first year, and 1.4 percentage point increase for other advanced European economies during the same period. These findings provide a cautionary note on the overall assessment of a low risk of wage-price spiral in Portugal.¹²

Specification 2: Peak Impact of Price Inflation on Wage Inflation (Percent)



Sources: Baba and Lee (2022), Haver Analytics, and IMF staff calculations.
Note: Error bars show 90% confidence interval

E. Conclusions

16. Overall, our analysis on inflation processes suggests that inflation in Portugal has likely peaked, but some upside risks should not be ignored. The analysis of inflation dynamics based on the estimated Phillips curve for Portugal suggests that beyond the predominant role of commodity prices, the recent surge in inflation has been driven by external price pressures but also to some extent by labor market tightness. Inflation is projected to ease in 2023 and 2024—driven by falling energy prices and in the context of anchored expectations. This downward path should be sustained under most alternative assumptions. However, inflation would increase if the inflationary process became backward looking or energy prices remained elevated for longer, or wage-inflation increases induced by pressures from energy prices become sustained. While these risks appear contained so far, the unprecedented nature of recent inflation dynamics and unusual forecast uncertainty points to the need for policies to remain focused on inflation reduction.

¹² The results of the econometric exercise do not consider institutional factors impacting wage formation in individual countries. For example, wages in Portugal are set under sectoral collective agreements, which are (in most cases) negotiated during the first half the year. This may explain the only moderate passthrough of inflation to wages observed in 2022, as many collective wage contracts had already been set before inflation started picking up in 2022H2. Conversely, collective wage contracts in 2023 may reflect not only inflation expectations for the rest of 2023 but also real wage losses observed in 2022.

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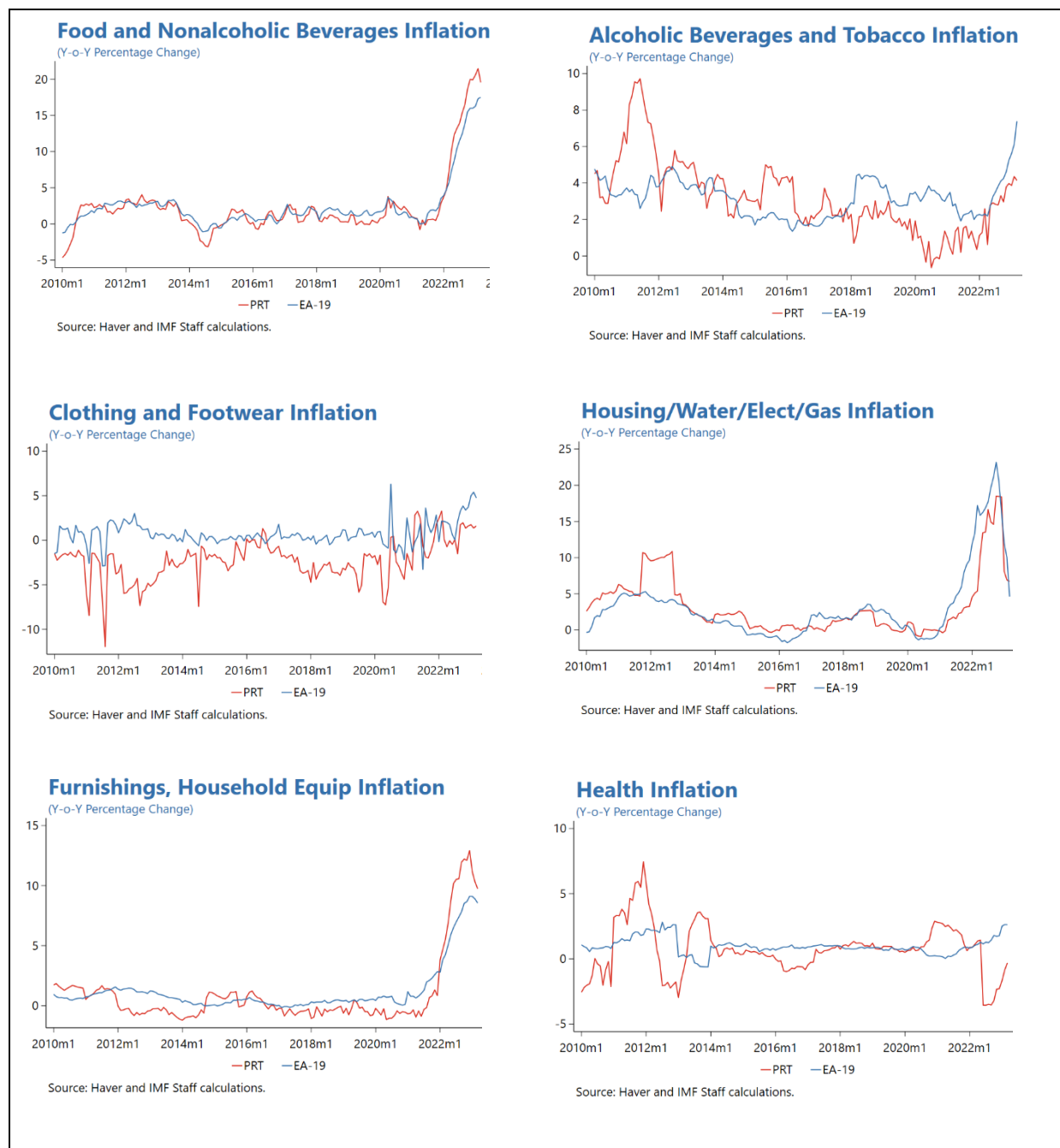
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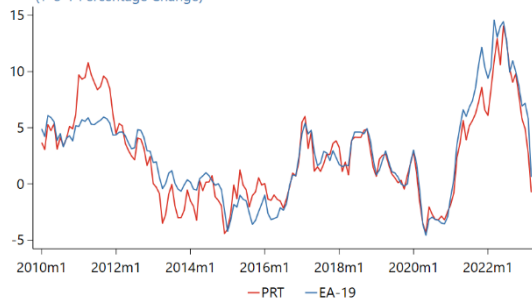
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Annex I. Components of HICP Inflation in Portugal and EA



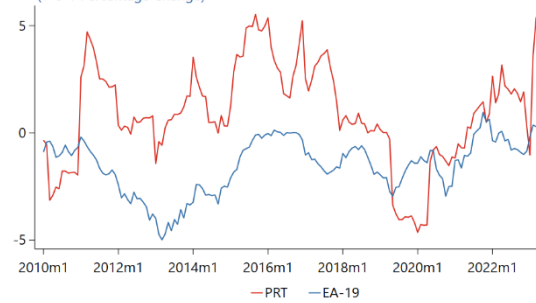
Transport Inflation

(Y-o-Y Percentage Change)



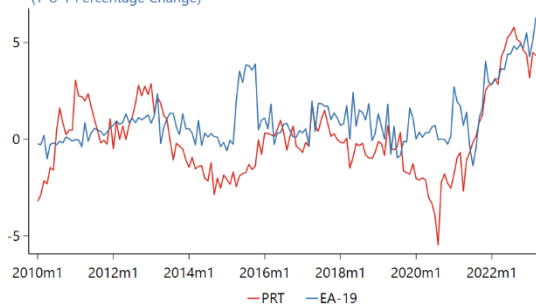
Communications Inflation

(Y-o-Y Percentage Change)



Recreation and Culture Inflation

(Y-o-Y Percentage Change)



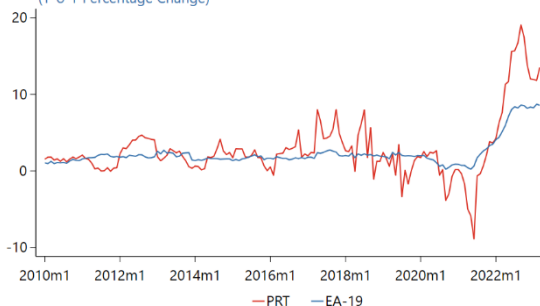
Education Inflation

(Y-o-Y Percentage Change)



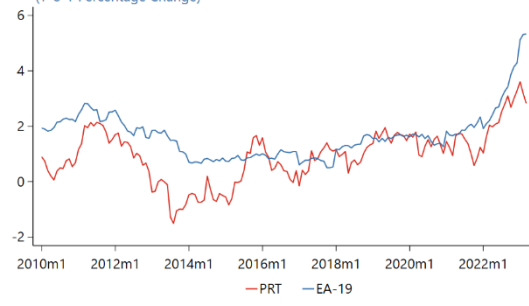
Hotels, Cafes and Restaurants Inflation

(Y-o-Y Percentage Change)

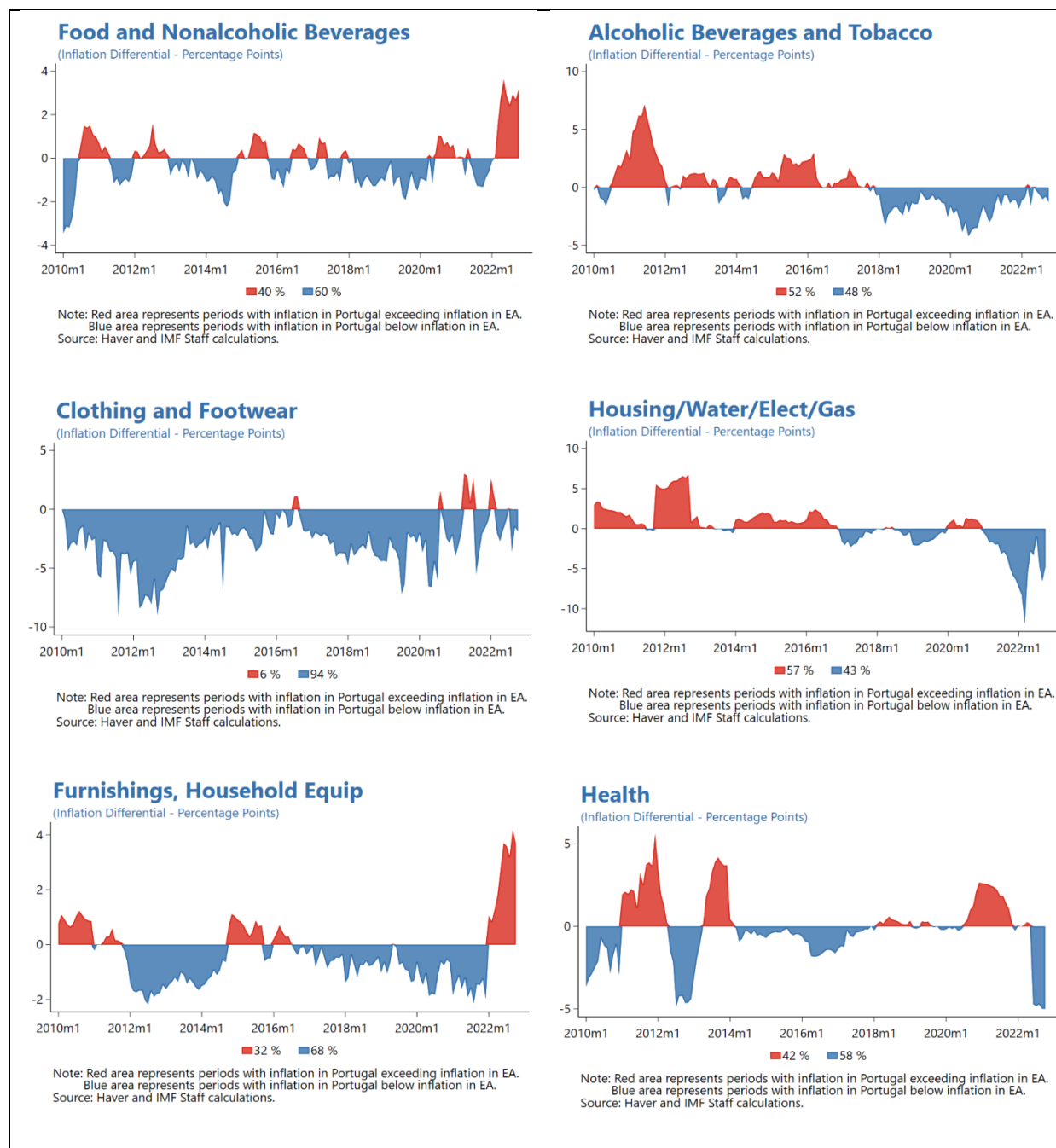


Miscellaneous Goods and Services Inflation

(Y-o-Y Percentage Change)

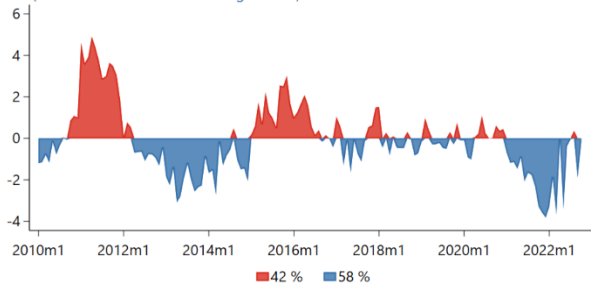


Annex II. Inflation Differential between Portugal and EA across Components



Transport

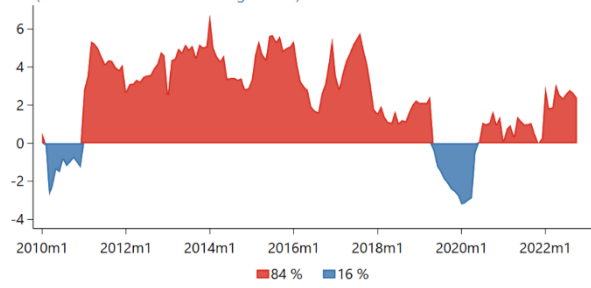
(Inflation Differential - Percentage Points)



Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

Communications

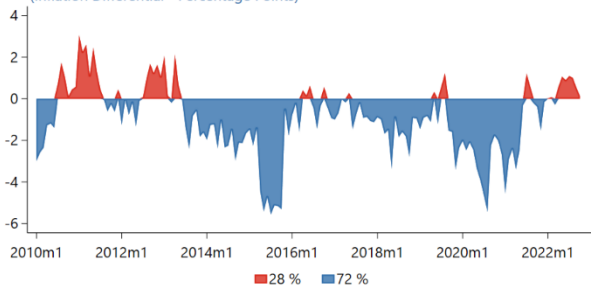
(Inflation Differential - Percentage Points)



Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

Recreation and Culture

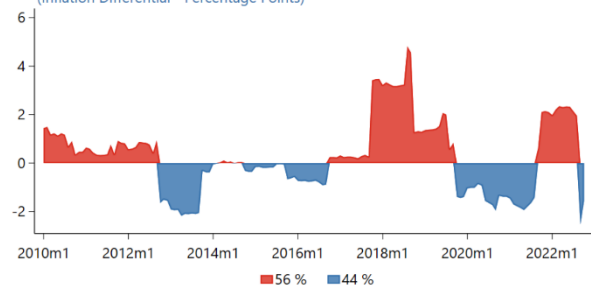
(Inflation Differential - Percentage Points)



Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

Education

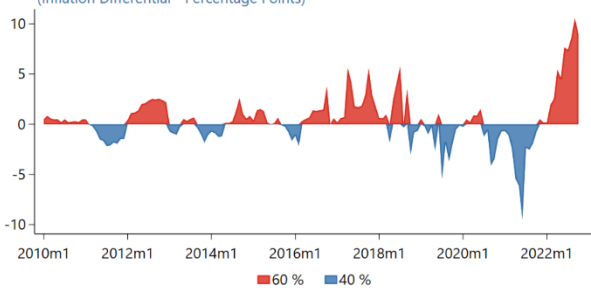
(Inflation Differential - Percentage Points)



Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

Hotels, Cafes and Restaurants

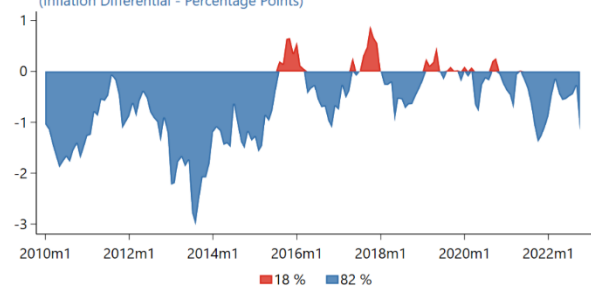
(Inflation Differential - Percentage Points)



Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

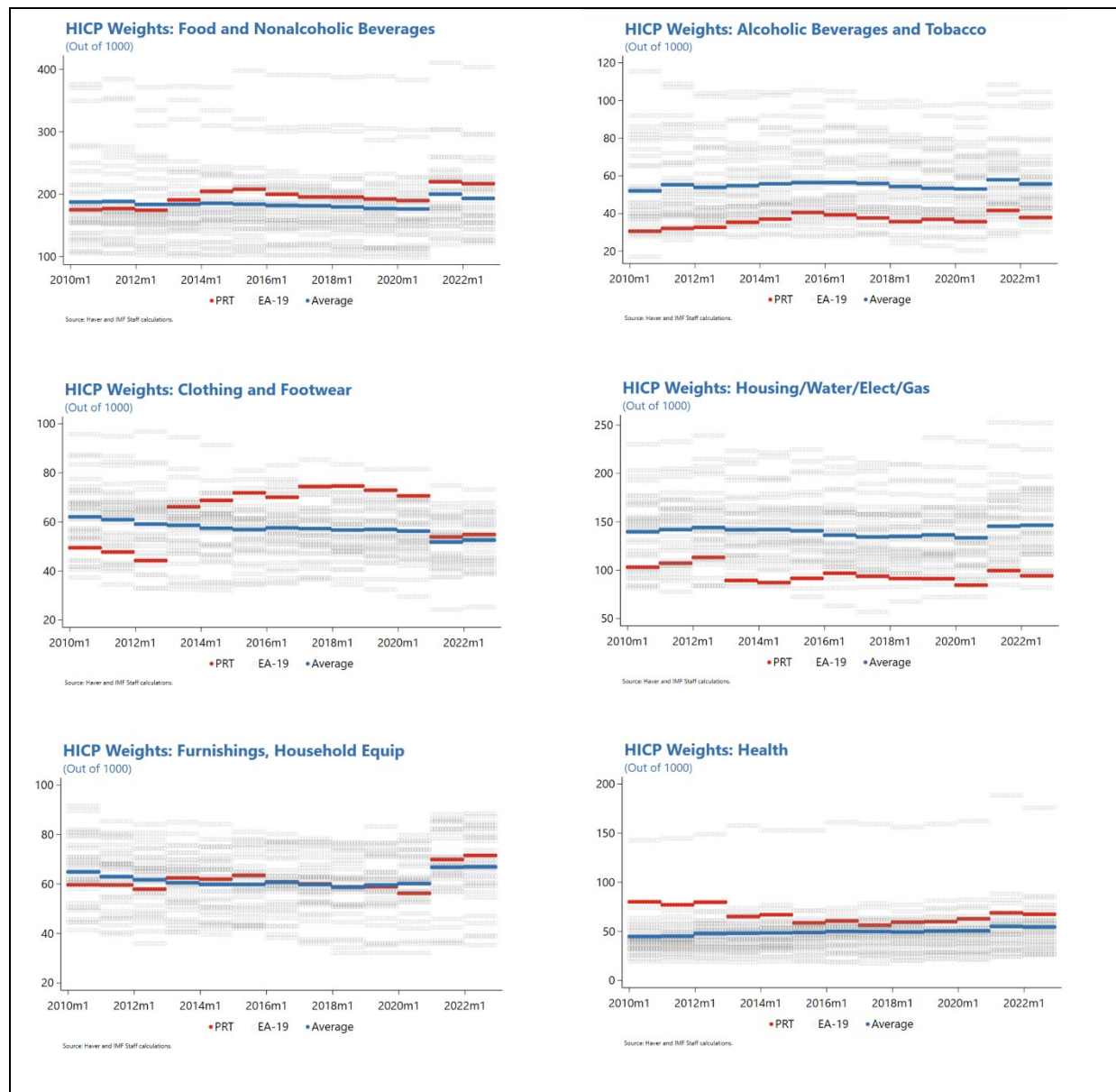
Miscellaneous Goods and Services

(Inflation Differential - Percentage Points)



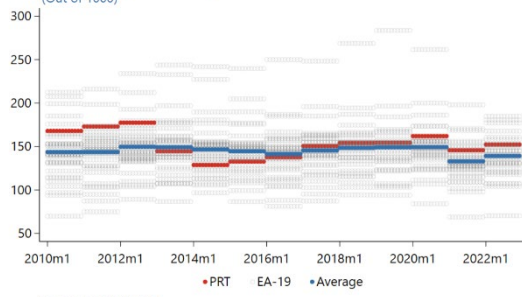
Note: Red area represents periods with inflation in Portugal exceeding inflation in EA.
Blue area represents periods with inflation in Portugal below inflation in EA.
Source: Haver and IMF Staff calculations.

Annex III. HICP Inflation Weights in Portugal and EA



HICP Weights: Transport

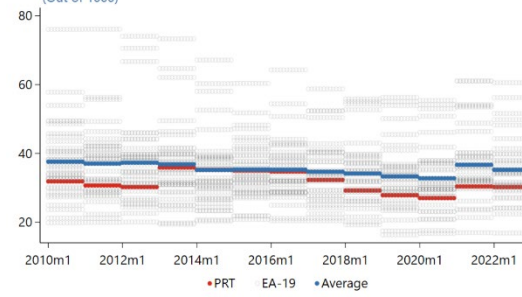
(Out of 1000)



Source: Haver and IMF Staff calculations.

HICP Weights: Communications

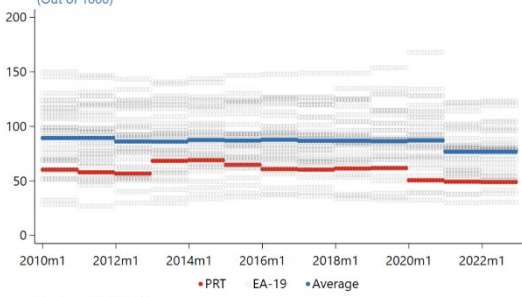
(Out of 1000)



Source: Haver and IMF Staff calculations.

HICP Weights: Recreation and Culture

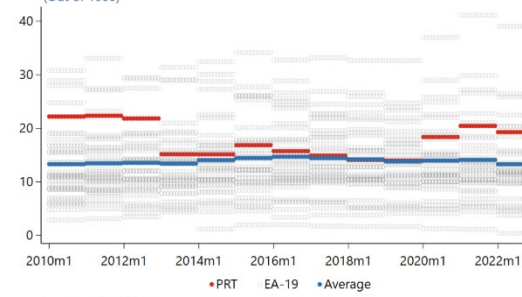
(Out of 1000)



Source: Haver and IMF Staff calculations.

HICP Weights: Education

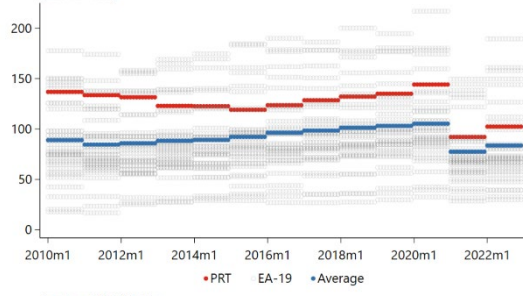
(Out of 1000)



Source: Haver and IMF Staff calculations.

HICP Weights: Hotels, Cafes and Restaurants

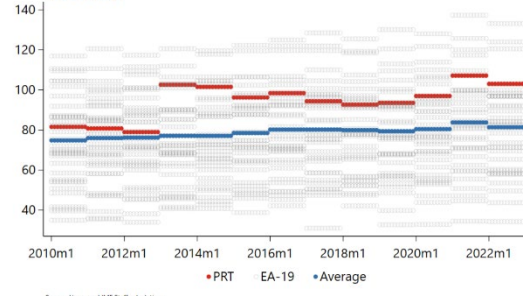
(Out of 1000)



Source: Haver and IMF Staff calculations.

HICP Weights: Miscellaneous Goods and Services

(Out of 1000)



Source: Haver and IMF Staff calculations.