

Regional heterogeneity in recent inflation developments in Spain

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Rationale

Inflation has recently performed heterogeneously across Spain's different regions. This article provides a detailed analysis of such heterogeneity and looks at some of its main determinants.

Takeaways

- Between June 2019 and June 2024, cumulative inflation for the Spanish economy as a whole amounted to 18.9%.
- Cumulative inflation has varied appreciably across regions. Castile-La Mancha and Galicia were the regions with the highest cumulative inflation in this period (21.2% and 20.4%, respectively), while Madrid and Catalonia recorded the lowest relative price rises (17.1% and 18.1%, respectively).
- Heterogeneity in regional inflation rates, something that is also seen in other European countries, has essentially reflected the cross-regional differences in the composition of household consumption baskets.

Keywords

Inflationary process, underlying inflation, energy shocks.

JEL classification

E31, E66, R11.

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The heterogeneity of inflation in the different regions

One way of measuring the dispersion of inflation rates across regions is the differential between the minimum and maximum year-on-year inflation rates recorded each month in the different regions. In Spain, this differential widened between 2019 and 2023, recording its highest value since the mid-1980s in June 2022 (4.2 percentage points (pp)), when headline inflation peaked in Spain, and has narrowed thereafter (see Chart 1.a).¹

An alternative measure of dispersion is the standard deviation of regional inflation each month. This indicator also surged up to mid-2022, easing thereafter,² to stand in 2024 at levels similar to those observed pre-pandemic. Note that the regional dispersion of inflation also widened in other euro area countries, such as Germany and Italy (see Chart 1.b), as well as in the United States.³

In consumer price index (CPI) terms,⁴ cumulative inflation between June 2019 and June 2024 varied across the different regions (see column 1 of Table 1). Specifically, Castile-La Mancha was the region with the highest cumulative inflation (21.2%), with Madrid at the opposite end of the scale (17.1%).

Regional heterogeneity in inflation rates is also observed in each of the four main groups into which the CPI is typically broken down (energy products, food, services and non-energy industrial goods (NEIG)). Thus, between 2019 and 2022, the dispersion of regional inflation rates widened in the four CPI groups considered, albeit more so in energy products (see Chart 1.c). The Canary Islands was the region with the highest cumulative inflation in this component between June 2019 and June 2024, recording energy price rises of 27.6%, 5.5 pp more than the national average and 8.2 pp more than Madrid, the region with the lowest cumulative energy inflation (see column 2 of Table 1).

It is therefore worth analysing, first, the sources of divergence within the energy component. The prices of electricity, natural gas and butane, which account for almost 50% of this component at national level, are measured centrally, such that there is only one CPI for these headings for all regions. Nevertheless, their contribution to headline inflation differs across the regions, as it depends on their respective weight in the CPI consumption basket. For example, the cumulative change in natural gas and butane prices between June 2019 and June 2024 was the same across

1 The wider dispersion in the early 1980s, prior to the launch of the Economic and Monetary Union, is related to the impact of the second oil shock on inflation.

2 The dispersion of regional inflation rates tends to become more pronounced in episodes of high inflation (Buelens, 2023).

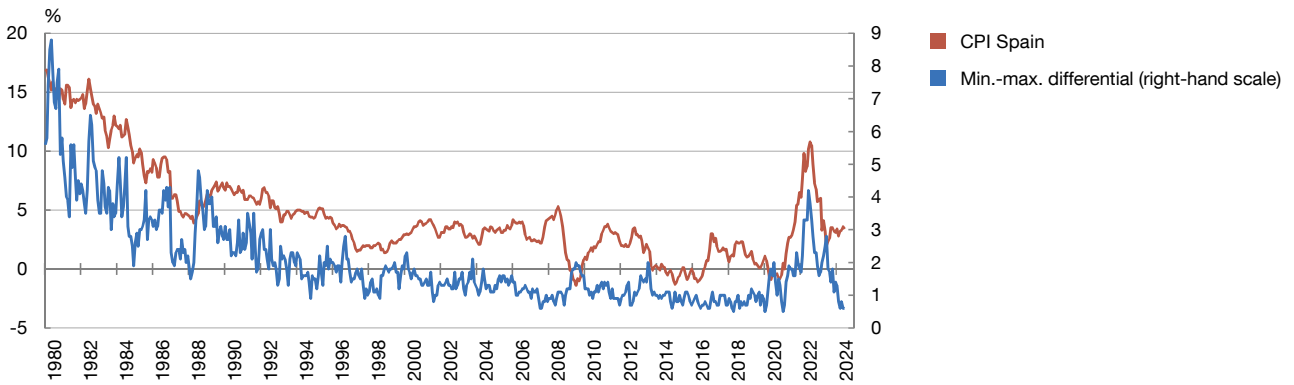
3 Gupta and McGranahan (2023) and Fuller and Gascon (2022).

4 The National Statistics Institute (INE) only publishes information on regional inflation in CPI terms. This article therefore focuses on this measure of prices rather than the harmonised index of consumer prices that the Banco de España typically uses to analyse inflation.

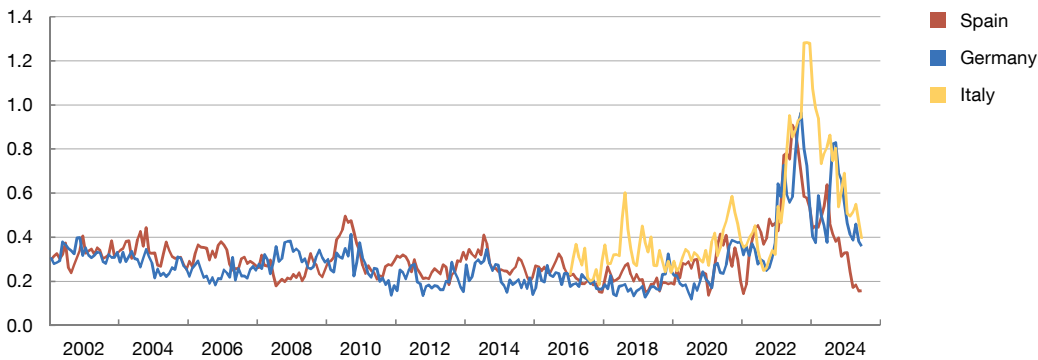
Chart 1

Dispersion of inflation rates at regional level

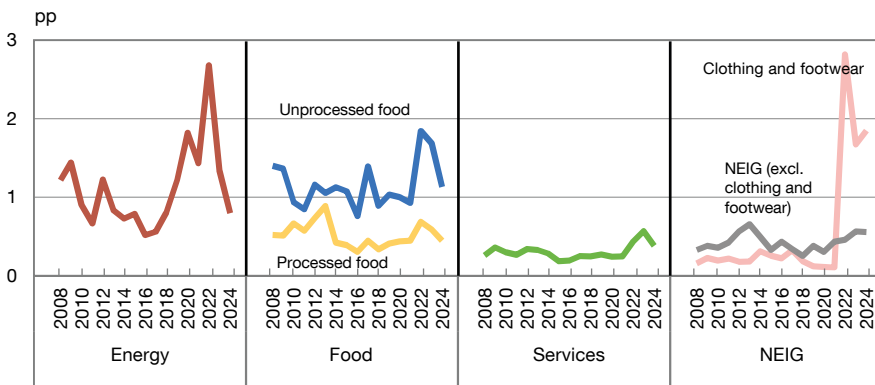
1.a Headline inflation rate in Spain and difference between the minimum and maximum rates each month in the different regions (a)



1.b Dispersion of the regional inflation rates in Spain, Italy and Germany (b) (standard deviation of the year-on-year inflation rates)



1.c Standard deviation of the annual average inflation rates of the regions, by special group (c)



SOURCES: INE, Eurostat and Banco de España.

- a The differences are calculated for the actual year-on-year rates in each month of the period under review.
- b A total of 17 regions in Spain, 20 in Italy and 16 in Germany. The dispersion in each month is calculated drawing on the actual year-on-year rates observed in the month in question in each region of each country.
- c 2024 refers to the average for January-June of that year.

Table 1

Inflation rates, weights and contributions, by region and special group

	Headline inflation (Jun-2024 / Jun-2019) (1)	Inflation (Jun-2024 / Jun-2019)				Weight in 2024				Contribution to inflation (Jun-2024 / Jun-2019)			
		ENERGY (2)	FOOD (3)	SERV. (4)	NEIG (5)	ENERGY (6)	FOOD (7)	SERV. (8)	NEIG (9)	ENERGY (10)	FOOD (11)	SERV. (12)	NEIG (13)
Andalusia (AND)	19.7	23.3	33.0	14.7	8.9	9.3	25.0	43.7	22.0	2.8	8.6	6.1	2.3
Aragon (ARA)	19.1	23.5	33.0	13.4	9.5	9.5	22.3	47.1	21.0	3.0	7.8	6.0	2.3
Asturias (AST)	18.4	22.6	32.3	13.4	8.4	9.5	21.6	47.6	21.3	2.8	7.4	6.1	2.1
Balearic Islands (BAL)	19.7	23.5	32.8	15.1	10.8	8.9	21.3	48.9	20.8	2.7	7.3	7.2	2.6
Canary Islands (CANA)	19.1	27.6	35.3	14.0	6.4	7.8	23.2	47.4	21.6	2.7	8.5	6.3	1.6
Cantabria (CANT)	19.0	20.1	32.8	12.4	11.4	10.0	23.8	44.5	21.7	2.6	8.3	5.3	2.8
Castile-Leon (CYL)	20.1	23.1	34.0	13.3	10.6	10.3	24.3	44.3	21.0	3.2	8.8	5.6	2.5
Castile-La Mancha (CLM)	21.2	25.8	34.3	14.6	10.6	11.1	25.4	42.0	21.5	3.7	9.1	5.9	2.6
Catalonia (CAT)	18.1	20.2	29.7	12.4	11.7	9.4	22.6	48.6	19.4	2.5	7.1	5.9	2.6
Valencia (CVA)	19.1	22.0	32.2	14.4	9.2	9.4	22.8	46.2	21.6	2.7	7.7	6.3	2.3
Extremadura (EXY)	19.6	23.3	35.3	12.6	6.2	9.8	27.8	41.1	21.4	2.9	10.2	4.9	1.5
Galicia (GAL)	20.4	23.3	33.3	15.4	10.5	9.9	23.9	43.0	23.2	2.9	8.4	6.3	2.7
Madrid (MAD)	17.1	19.4	33.0	11.9	8.2	9.1	20.3	51.9	18.8	2.3	7.0	5.9	1.8
Murcia (MUR)	19.4	22.2	32.6	14.0	9.9	9.1	25.4	43.5	22.0	2.5	8.5	5.8	2.5
Navarre (NAV)	19.2	24.5	33.4	12.7	12.3	9.1	20.6	47.7	22.6	3.0	7.3	5.7	3.1
Basque Country (PVA)	19.2	20.0	33.4	13.4	11.7	8.9	21.9	49.0	20.2	2.3	7.8	6.4	2.7
Rioja (RIO)	18.7	22.0	29.6	14.2	9.9	10.2	22.6	46.8	20.5	3.0	7.2	6.2	2.3
Spain (ES)	18.9	22.1	32.6	13.4	9.7	9.4	23.0	46.9	20.8	2.7	7.9	6.0	2.3
Difference (max.-min.)	4.2	8.2	5.7	3.5	6.1	3.3	7.5	10.8	4.3	1.4	3.2	2.3	1.6

SOURCES: Eurostat and Banco de España.

NOTE: Energy, food, serv. and NEIG refer, respectively, to the CPI groups Energy products, Food, beverages and tobacco, Services and Non-energy industrial goods. To calculate the contributions to cumulative inflation, we use Ribe's decomposition (Brunetti, 2010) for periods longer than one year.

all regions (-6.3% and +22.4%, respectively).⁵ However, their weights in the CPI consumption basket differ across regions, due, mainly, to the differing degree of coverage of the natural gas network; the greater the network's coverage, the higher (lower) the weight of natural gas (butane) in the consumption basket (see Chart 2.a).⁶ Thus, the cumulative increase in the index that aggregates both subclasses (CPI - Gas) was considerably smaller in regions such as Navarre, Madrid, Catalonia and Rioja, where the coverage of the natural gas network is broader.

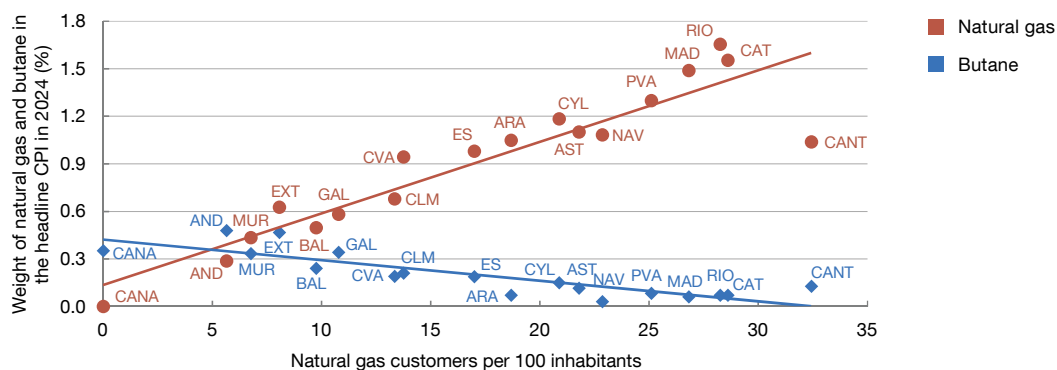
5 In the same period, electricity prices rose by 15.2% across all regions. Note that the INE does not provide region-level data on the electricity, natural gas and town gas and liquefied hydrocarbons (butane, propane, etc.) CPI subclasses. However, as they are measured centrally, we can assume that the CPI of the different subclasses is, in each region, equal to that published at national level.

6 For each region, the CPI - Gas index can be estimated using the information provided for the energy-related CPI aggregates. On the basis of this and of the national indices of the natural gas and town gas and liquefied hydrocarbons subclasses, we can approximate the weights of these subclasses in each region's CPI consumption basket.

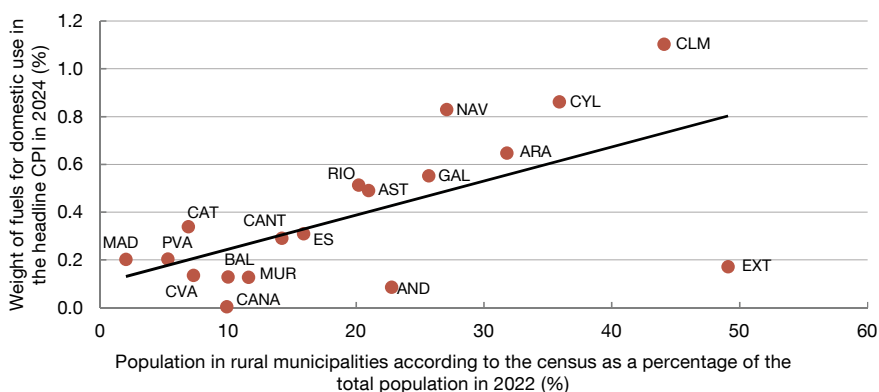
Chart 2

Some determinants of the cross-regional heterogeneity of inflation

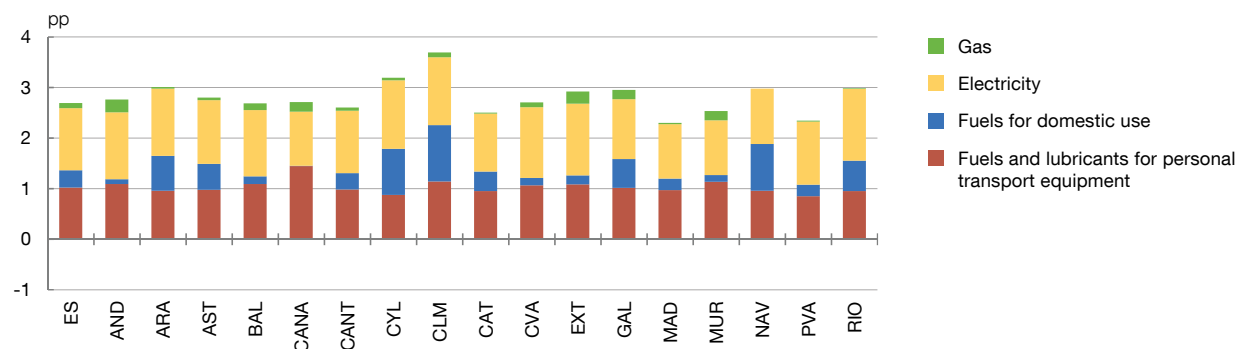
2.a Penetration of the natural gas network and approximated weight of natural gas and town gas and butane in the headline CPI, by region (a)



2.b Proportion of the rural population and weight of fuels for domestic use in the CPI, by region (b)



2.c Contribution of CPI - Energy components to cumulative headline inflation between June 2024 and June 2019, by region (c)



SOURCES: INE, Eurostat and Banco de España.

- a Weights approximated by estimating the index and the weight of gas in the CPI for each region and the national indices of the CPI subclasses natural gas and town gas and liquefied hydrocarbons (butane, propane, etc.).
- b The weight of vehicle fuels in each region's consumption basket is estimated drawing on the information provided by the INE for the different energy-related CPI aggregates at regional level.
- c To calculate the contributions to cumulative inflation, we use Ribe's decomposition (Brunetti, 2010) for periods of over one year.

By contrast, the changes in the prices of vehicle fuels and fuels for domestic use can be used to show cross-regional differences.⁷ The cumulative increase in vehicle fuel prices between June 2019 and June 2024 ranges from 17.7% in Cantabria to 27.9% in the Canary Islands. Given the high weight of this component in the regions' consumption baskets (4-5.3% of the CPI in 2024), it has made a particularly strong contribution to headline inflation in all regions, although the considerable contribution in the Canary Islands stands out. The cumulative inflation of fuels for domestic use in the period under review was somewhat higher, ranging from 26% in the Canary Islands to 34% in the Balearic Islands. Given the size of the price growth of this heading, the contribution to cumulative energy inflation was high in those regions where its weight in the consumption basket is relatively higher, which is linked to having a higher share of the population in rural areas (see Chart 2.b).⁸ Thus, the contribution of fuels for domestic use to headline inflation has been uneven and particularly high in Castile-La Mancha, Castile-Leon and Navarre (see Chart 2.c).

Meanwhile, the cumulative inflation of food, beverages and tobacco ("food") between June 2019 and June 2024 was higher than that of energy across all regions, but its regional dispersion was somewhat narrower (see column 3 of Table 1). Extremadura and the Canary Islands were the regions with the highest cumulative food inflation in the period under review (35.3%), 2.7 pp more than the national average and 5.7 pp more than Rioja, the region with the lowest food inflation. All the headings for which there is a regional breakdown of the food component showed some degree of cross-regional divergence in the period under review, although the increase in the dispersion was more pronounced in unprocessed food than in processed food (see the second panel of Chart 1.c). In the major food headings, between June 2019 and June 2024 there is greater regional divergence in the cumulative inflation of eggs and oils and fats, foodstuffs in which the highest increases were also recorded (see Chart 3.a).⁹

Turning to services, the cross-regional differences in the cumulative inflation rates for this component between June 2019 and June 2024 were smaller than in the others. Galicia was the region with the highest cumulative services inflation (15.4%), 3.5 pp higher than Madrid, which recorded the lowest figure (11.9%). Upon analysing the services CPI groups, we see that some of them have inflation rates that are common to all regions,¹⁰ while elsewhere there are considerable regional differences. With regard to catering services, which account for 13% of the national CPI consumption basket in 2024, Navarre and Catalonia recorded the lowest cumulative inflation (18.2% and 18.4%, respectively), while Galicia has the highest cumulative rate (25.6%). The cumulative inflation of accommodation services is more widely dispersed, ranging from 37.9% in Madrid to 15.4% in Rioja. Note that the heterogeneity in accommodation services inflation in

7 The CPI classes fuels and lubricants for personal transport equipment and liquid fuels (dubbed "fuels for domestic use" in this article) are not published by the INE at regional level. However, as in the case of CPI - Gas, it can be estimated it using the information provided for the energy-related CPI aggregates.

8 The higher weight of fuels for domestic use in rural areas may be linked to various factors, such as the difficulties inherent in extending the distribution network in those areas.

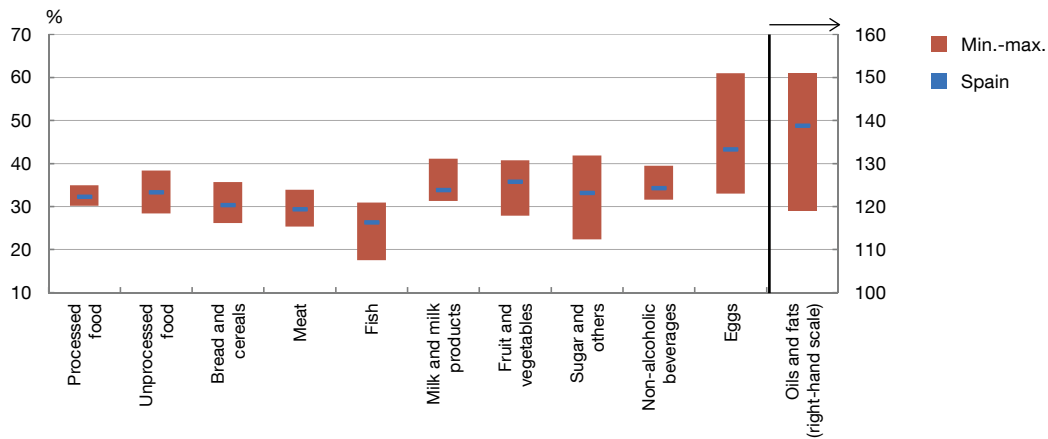
9 Navarre was the region with the highest increase in oils and fats prices between June 2019 and June 2024 (151%), while the lowest increase was recorded in Cantabria (119%). The highest increases in egg prices were in Castile-La Mancha (61%) and the lowest were in Catalonia (33%).

10 Examples include the purchase of vehicles, telephone services, package holidays, insurance and financial services, which overall account for 22.2% of the services in the national CPI consumption basket in 2024.

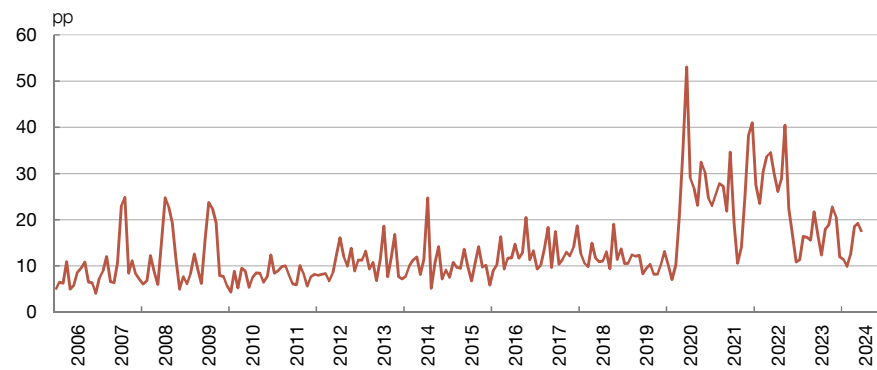
Chart 3

Dispersion of inflation rates across regions: selected headings

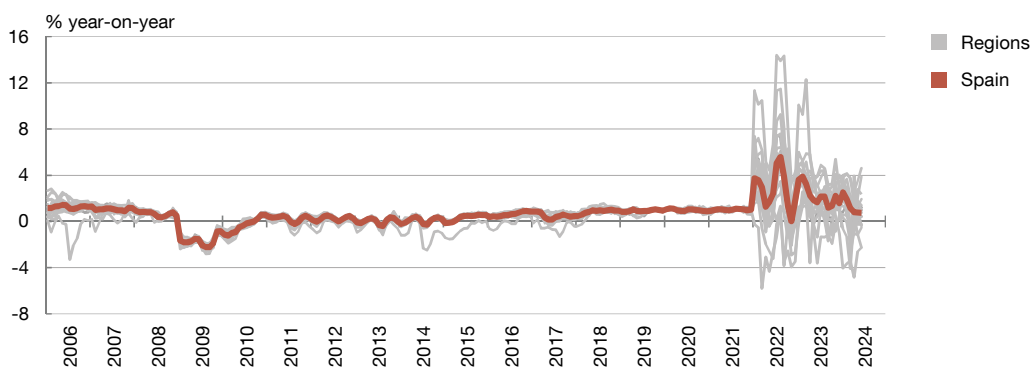
3.a CPI - Food: cumulative inflation between June 2024 and June 2019



3.b CPI - Accommodation services: difference between min. and max. year-on-year inflation rates recorded in each month in the different regions



3.c CPI - Clothing and footwear, by region



SOURCES: INE, Eurostat and Banco de España.

particular was especially strong during the pandemic – when the containment measures had a greater effect – and the reopening of the economy (see Chart 3.b). However, in 2024 Q2 accommodation services inflation rates remained more dispersed than in the pre-pandemic period. In addition, within services the divergences in inflation rates for urban and intercity public transport also stand out, due to the different scope of the subsidies and free public transport measures, which were implemented by the Spanish Government nation-wide, but topped up by the regional governments to differing degrees (see the third section of this article).

Lastly, the differences in regional NEIG inflation were marked by developments in the clothing and footwear CPI division, which accounts for 19% of the NEIG in the national CPI consumption basket in 2024. This division has seen the widest divergences in regional inflation since January 2022, due to the methodological changes introduced since then in how prices are measured during seasonal sales (see Chart 3.c).¹¹ Thus, the cumulative change in clothing and footwear prices between June 2019 and June 2024 ranges from -2.3% in the Canary Islands to 10.8% in Navarre. Taking into account NEIG as a whole, the greatest cumulative change in the period under review was in Navarre (12.3%), while the smallest was in Extremadura (6.2%). However, when clothing and footwear are stripped out, the regional dispersion in NEIG inflation decreases significantly (see the right-hand panel of Chart 1.c).

The importance of the composition effect in explaining the heterogeneous inflation patterns across the different regions

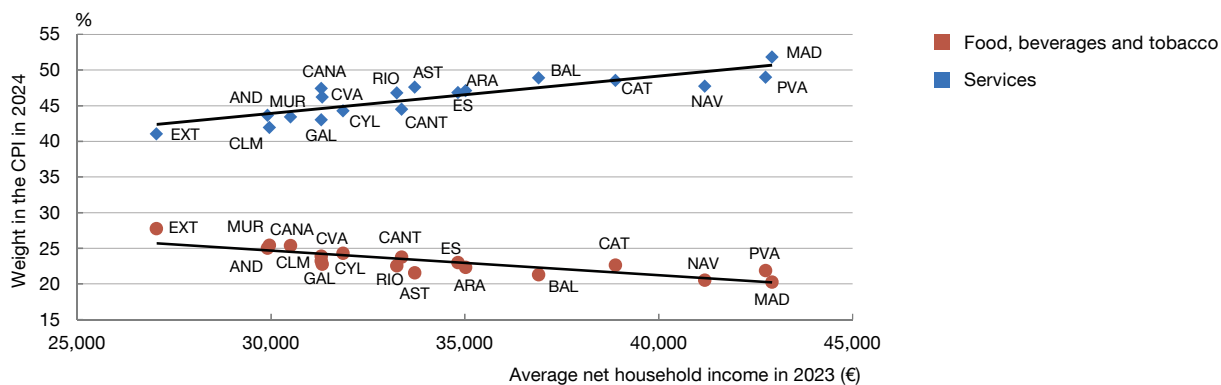
The variations in the prices of the different components that make up the CPI affect each region's headline inflation differently, depending on the weight such components have in the regional CPI consumption basket. For instance, there are regional differences in the weight of services and of food (see columns 7 and 8 of Table 1), which have to do with the level of average household income in each region (see Chart 4.a). On the one hand, services have the highest weight in the Madrid consumption basket (the region with the highest average household income). This, together with the lower cumulative inflation recorded for this component between June 2019 and June 2024, has meant that services made a relatively small contribution to headline inflation in this region (see column 12 of Table 1). Conversely, Extremadura is the region in which food has the greatest weight in the CPI basket and, in turn, in which cumulative food inflation in the period under analysis was highest, and this component therefore made a larger contribution to headline inflation as compared with other regions (see column 11 of Table 1). Much the same can be said of energy products in Castile-La Mancha, where this component has the highest weight in the CPI basket and which, moreover, recorded the second highest cumulative energy inflation in the period analysed, resulting in the biggest contribution to headline inflation by this component of any region (see column 10 of Table 1).

11 In particular, with the re-basing of the CPI, in 2022 the methodology for treating clothing prices was revised, such that price changes in seasonal sales, discounts and new seasons are recorded as and when they are made at the store. According to INE (2022), previously “the applied process consisted of replicating the same scheme each year, trying to ensure that the number of discounted or seasonal prices in each province is similar one year and the next, leaving pending for the following month, or estimating if they have not yet been collected, the offers and seasonal variations”.

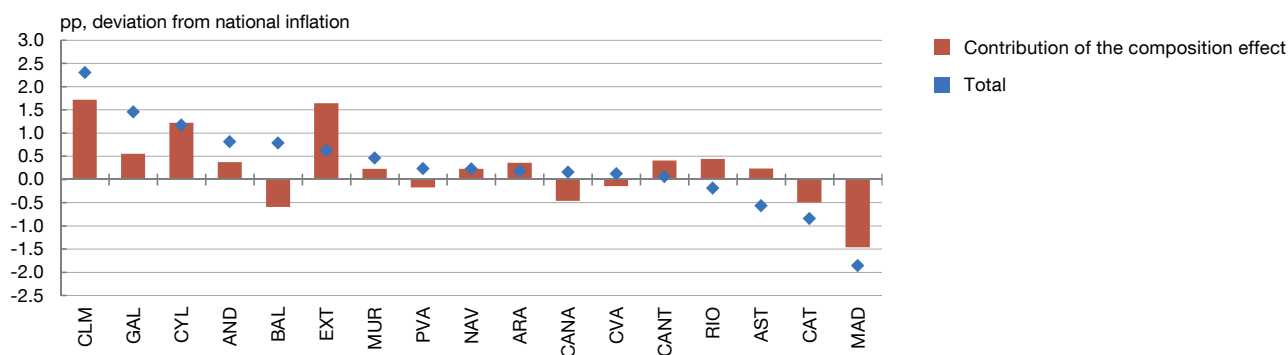
Chart 4

The role of the composition effect in the different inflation developments across regions

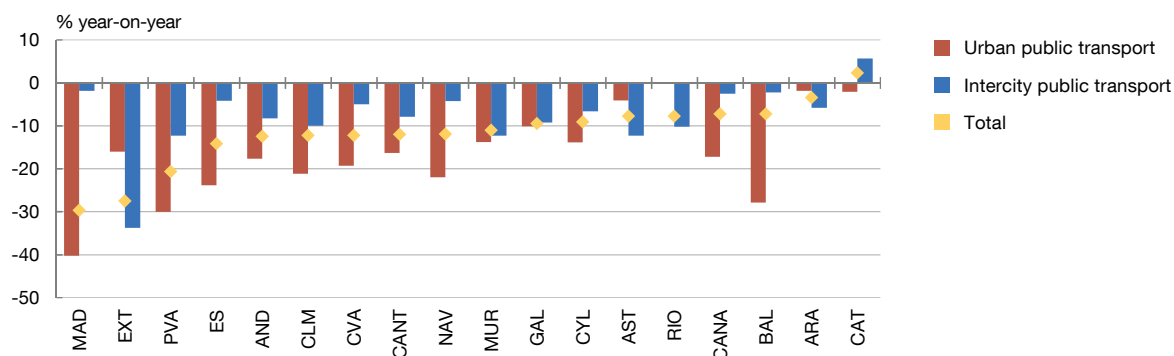
4.a Household income and weight of services and food in the CPI consumption basket, by region



4.b Decomposition of cumulative headline inflation between June 2024 and June 2019 (a)



4.c CPI - Public transport: change between June 2024 and June 2022



SOURCES: INE and Banco de España.

a The composition effect is the difference between actual inflation in each region and the inflation that would have been observed if the weights of the different CPI headings in each region were the same as the national average.

One way of quantifying how much these regional differences in the weights of the different CPI components contributed to cumulative inflation between June 2019 and June 2024 is to estimate where inflation would have stood in each region had the weights of such components been the same as the national average. The difference between the observed inflation and this hypothetical inflation may be understood as the effect of the differences in the composition of the regional consumption baskets (the “composition effect”). Chart 4.b shows how the composition effect contributed to the difference in cumulative headline inflation between June 2019 and June 2024 in each region. This effect explains most of the regional differences, particularly in the case of Castile-La Mancha, Extremadura and Castile-Leon (owing to the considerable weight of both food and energy). Conversely, the composition effect estimated for the Madrid region accounts for a significant percentage of the negative inflation gap with respect to the national average, essentially due to the low weight that food has in its consumption basket and to the greater weight of the services and public transport components.

The effect of public transport-related measures to curb inflation

In recent years, the measures set in place by the Government to contain inflation¹² have, broadly speaking, been identical across all regions. For example, thanks to the tax cuts approved, the prices of the components affected declined by an identical percentage country-wide. Nonetheless, the impact of these measures on headline inflation varied from region to region, which can only be explained by the differences in the weights of the components targeted by the measures in the regional consumption baskets. By way of example, the lower VAT on gas did more to reduce inflation in the regions in which natural and town gas account for a larger share of the CPI consumption basket.

Meanwhile, in the case of the public transport-related measures, further sources of heterogeneity can be seen in terms of their impact on inflation in the regions. Here, in addition to the composition effect-related differences (associated with differences in the use and availability of the different types of public transport in each region),¹³ there were also cross-regional differences in the size of the discounts applied.

First, in terms of the composition effects of the public transport-related measures, it is worth noting, for instance, the role played by free regional and medium-distance train tickets for regular travellers. In particular, although this measure has been applied equally throughout Spain, its impact on inflation has been greater in the most important railway hubs, such as Madrid or

12 Between July 2021 and the cut-off date for this article, the government first approved (and then extended or let expire) various measures to keep inflation in check in the face of the energy crisis. The measures approved include lower VAT on electricity and gas, a reduction to the excise duty on electricity, a reduction to the electricity charges paid by consumers, a cap on increases in the regulated rate for natural gas consumers, a €0.20/l discount on vehicle fuel prices, a cap on annual rent increases under lease agreements, the implementation of the Iberian mechanism to curb the impact of higher gas prices on electricity prices, a cap on variations in the maximum butane gas price, subsidised and free public passenger transport and lower VAT on food.

13 Public transport includes, inter alia, passenger transport by rail, road, air and sea and combined passenger transport. While there is no regionally disaggregated information on the weight of each mode of transport, the relative weight of passenger transport by sea within the public transport component is, for example, likely to be greater in Spain’s island regions than in its inland regions.

Catalonia.¹⁴ Second, as regards the differences in the extent to which the public transport discounts have been applied, some of the public passenger transport-related measures were made conditional on a minimum supplementary contribution by the regional or municipal authorities. A case in point were the subsidies aimed at reducing the price of public transport season tickets and travel cards by 50%, for which the central government undertook to fund a 30% discount, provided the regional or local authorities contributed, at least, an additional 20%.

Overall, these measures led to a greater dispersion in public passenger transport inflation across regions. Specifically, between June 2022 (before this type of discount was applied) and June 2024 the public urban transport CPI fell by 40% in the Madrid region and by almost 30% in the Basque Country and the Balearic Islands, as compared with the 24% decline observed in Spain overall (see Chart 4.c). In the case of Madrid, this greater decline can be explained, at least in part, by the higher discount applied by this region to public transport season tickets and travel cards (60%, as opposed to the 50% applied in most regions), possibly augmented by the fact that combined passenger transport probably accounts for a comparatively larger share of public transport in this region.¹⁵ Conversely, this component remained largely unchanged in Rioja, Aragon and Catalonia over the same period. In the case of public intercity transport, the biggest fall in prices between June 2022 and June 2024 came in Extremadura (a 34% drop), largely due to the region's free bus transport, whereas such prices rose by around 6% in Catalonia (prices fell by 6% in Spain overall).

In addition to these differences in price variations, the cross-regional divergence in the weights of the (urban and intercity) public transport components in the CPI consumption baskets is also very striking. In the Canary Islands, Madrid and the Balearic Islands this component accounts for 3%, 2.6% and 2.2%, respectively, of the 2024 CPI consumption basket, far exceeding the figure for Extremadura, Murcia and Rioja (0.9% in all three cases).

Nonetheless, public transport made a similar contribution to cumulative inflation between June 2019 and June 2024 in most of the regions (ranging between -0.2 pp in the Canary Islands, the Basque Country and Extremadura and +0.1 pp in Catalonia). The exception was Madrid, where the contribution made by this component stood at -0.7 pp in the period analysed.

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14 According to the National Commission on Markets and Competition's *Annual Railway Report (2021)*, in 2021 Madrid and Barcelona accounted for around 85% of all regional railway passengers in Spain. The other regions that are home to a notable regional railway service hub are Valencia, the Basque Country, Andalusia, Asturias, Murcia, Cantabria and Aragon.

15 As noted above, most regions applied a 50% discount. Nonetheless, such discounts were higher in regions such as Asturias, Madrid, Andalusia and Murcia. In the Balearic and Canary Islands, the Government applied a 100% discount to the price of public transport season tickets and travel cards. In Barcelona, "T-Casual" cards were discounted by 50% between September and December 2022. Although this was not subsequently renewed, the 50% discount on the price of "T-Usual" cards was maintained. It is worth noting that the discounts applied to certain cohorts (students, retirees, etc.) are not included in the CPI measurement, as only discounts applied across the board are factored in.

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