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CAUSES OF THE RECENT INFLATION IN GREECE AND SUGGESTIONS FOR THE FUTURE

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Abstract
The paper explains the evolution of the general price level in Greece from 2010 onwards, in terms of aggregate demand and aggregate supply shifts; empirically analyzes the evolution of prices from 2000 onwards in terms of the long-term trend, the currency changeover, seasonal sales periods, intermediate deviations from the trend (due to taxes, the pandemic, the war in Ukraine/energy crisis, and increased post-pandemic spending), the minimum wage, the ECB interest rate, as well as the price of agricultural inputs; and provides policy suggestions based on the paper's explanations and findings.

Keywords
Prices & inflation, trend-seasonal-cyclical effects, impact of currency changeover, sales periods, minimum wage, ECB interest rates, agricultural inputs, pandemic lockdowns & post-pandemic spending, war in Ukraine & energy crisis, aggregate demand & supply

JEL Classifications: E31, C22

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1. Introduction

The sharp increase in price inflation from 2021 onwards in many advanced economies is attributed primarily to the pandemic lockdowns, and the Russian invasion of Ukraine. The first development adversely affected production and supply chains around the globe, causing shortages and a contraction of the aggregate supply. It also triggered fiscal and monetary expansion to support households and businesses affected by the lockdowns, resulting in an expansion of the aggregate demand. *Ceteris paribus*, a contraction of the aggregate supply or an expansion of the aggregate demand drives prices up. The latter development adversely affected the production capacity of Russia and Ukraine and, hence, the overall supply; while sanctions on Russia, especially against Russia's energy products, intensified the demand for critical energy commodities produced elsewhere around the world for several months. Together, the two developments pushed international prices up too. Climate-related disasters, business practices aiming to raise profits in certain industries, even a tool employed by the EU Commission to ensure duty revenues from imports, may have aggravated the situation, and one suspects that the resurgence of tensions in the Middle East and the Red Sea may have also adversely affected global supply chains and energy commodities prices (e.g., OECD, 2022; Andersen, 2023; European Commission, 2023; Hahn, 2023; Hansen et al., 2023; Matthews, 2023; Arce et al., 2024; Prodromidis and Lappas, 2024).

Inflationary developments in the small open eurozone economy of Greece fit into the narrative above. However, the evolution of macroeconomic variables from 2010 onwards shows that in the wake of the country's sovereign debt crisis of 2009-10 and a series of reform and austerity measures (as therapy), real Gross Domestic Product (GDP) per capita declined for a long time, while prices remained relatively stable or declined, and only lately real GDP per capita returned to the 2010-11 level and prices increased. See Figure 1.

The rest of the paper further probes the issue to reach actionable insights. In particular, Chapter 2 describes the said macroeconomic developments in Greece in terms of aggregate supply and aggregate demand shifts. Chapter 3 discusses the factors considered in the empirical analysis of the country's Consumer Price Index (CPI) from 2000 onwards, and Chapter 4 presents the results. Chapter 5 empirically studies the evolution of major consumer price sub-indices over the same time-frame and presents the results. Chapter 6 discusses the results and policy recommendations, and Chapter 7 concludes.

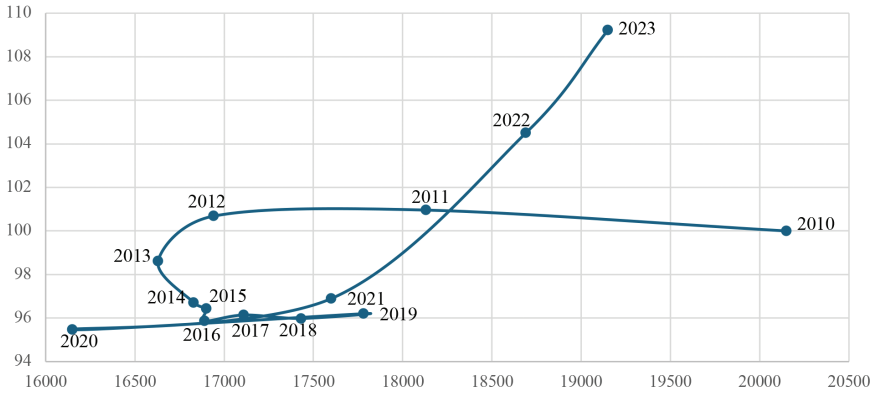
2. Macroeconomic developments

The evidence provided in Figure 1 suggests that reductions on the supply side during 2010-12 (i.e., a shift of the aggregate supply schedule to the left) dominated the changes that occurred on the demand side (shifts that occurred on the aggregate de-

mand schedule). See Figure 2, movement type A. This resulted in a steep reduction in output (income) and a small increase in the general price level.

Figure 1: The evolution of real per capita GDP and prices in Greece, 2010-23

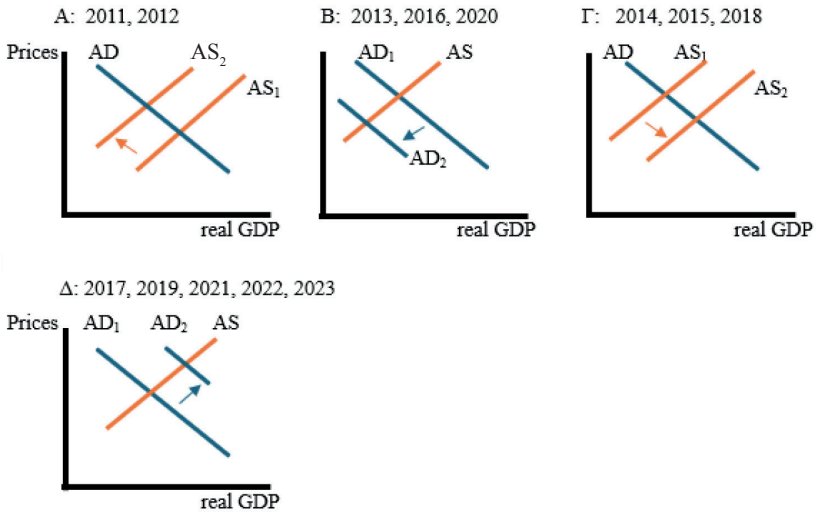
Price
(GDP deflator, 2010=100)



GDP per capita in terms of 2010 price (€)

Source: Eurostat (as updated on Jan.15 2024).

Figure 2: The four cases of dominant aggregate supply and demand (AS, AD) shifts in Greece, 2010-23



Note: The economy operates away from full employment.

Subsequently, a leftward shift (contraction) of the aggregate demand schedule dominated shifts that occurred on the aggregate supply schedule (movement type B). This resulted in a reduction in income and prices in 2013.[1]

Then the situation changed. The rightward shift of the aggregate supply dominated shifts that occurred on the aggregate demand front (movement type C). This resulted in higher income and lower prices in both 2014 and 2015 despite capital controls imposed in mid-2015.[2] By 2016 the contraction of the aggregate demand dominated developments on the aggregate supply front (movement type B); in other words, both income and prices decreased.

The following year the aggregate demand moved in the opposite deirection dominating the shifts that occurred on the aggregate supply front (movement type D). This resulted in a simultaneous increase in both income and prices in 2017. It was succeeded by C and D type movements in 2018 and 2019, respectively.

The succession of small income gains was halted with the advent of the deadly coronavirus pandemic in 2020, as lockdowns and other restrictions were imposed on social and economic activities to prevent contagion. At the same time, reductions in private spending and service exports led to a contraction of the aggregate demand schedule which dominated the shifts that occurred on the aggregate supply front (movement type B).

This was followed by a massive inflow and use of financial resources[3] to ensure coping with the consequences of the pandemic, of the energy crisis, and of natural disasters, as well as to pave the way for increased production in the future (movement type D). This resulted in considerable output growth during 2021, 2022 and 2023 compared to previous years.

It follows that the ongoing rise in the cost of living experienced in Greece is to considerable extent inextricably linked with the ongoing economic boom. Without ignoring the high monetary cost of weaning off Russian energy products and its negative consequences on Greece's output, what prevails is a type D movement. In many respects the situation is preferable to the situations of movement types A or B.

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1. *Ceteris paribus,* the aggregate demand falls (the aggregate demand schedule shifts left) with fiscal or monetary contraction (such as a reduction in government spending, a decrease in the money supply, a rise in interest rates) and rises with fiscal or monetary expansion. See Begg et al. (2008: 472-475).
2. *Ceteris paribus*, the aggregate supply increases (the aggregate supply schedule shifts to the right) when more or better inputs (labor, machinery, etc.) enter production, when the way these are combined in the production process improves, when distortions in inputs or final products markets are removed; while the aggregate supply decreases when the opposite happens. See Begg et al. (2008: 484).
3. Through EU co-funded programs, the public investment program, foreign direct investments, the new Recovery and Resilience Fund (RRF) etc.

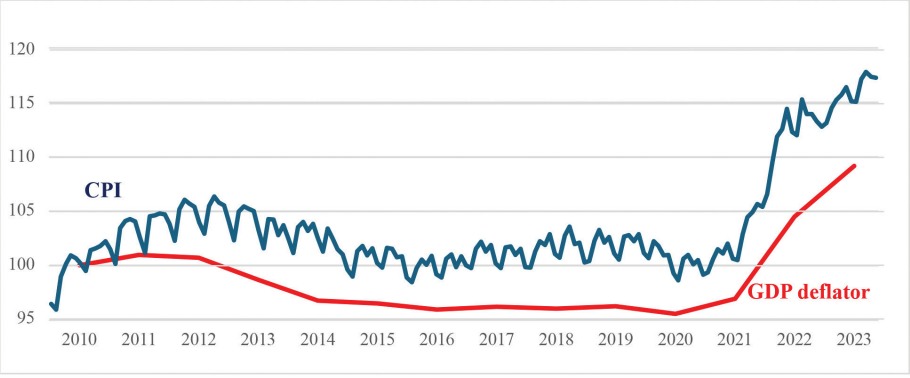
3. Data considerations and choices

To further probe what affected and keeps affecting the evolution of prices in Greece, we turn to the empirical analysis of the CPI. Of the two available price measures, the GDP deflator (supplied by Eurostat, the statistics office of the European Union) and the CPI (supplied by ELSTAT, the statistics authority of Greece):

- The GDP deflator is a measure of the monetary price of all new, domestically produced final goods and services (hence, it is not affected by increases in the prices of imported goods and services) and it is estimated on an annual basis.
- The CPI is a measure of the monetary price of a basket of goods and services purchased by consumers in the country−whether the said goods and services are domestically produced or not, it is hence, to some or considerable degree, affected by increases in the prices of imported goods and services−and it is estimated on a monthly basis.

The former is not based on a fixed basket of goods and services (in fact, the basket is allowed to change from year to year with people's consumption and investment patterns, as they substitute expensive goods and services with less expensive ones), while the latter is based on a fixed basket of goods and services. This means that the CPI is likely to overestimate the rise in prices relative to the GDP deflator. Accordingly, as illustrated in Figure 3, where both price measures are set to commence from the same base year, the CPI by-and-large overtakes the GDP deflator. The CPI also allows the analysis to be carried out with many more observations: Where the GDP deflator has 13 or 25 annual observations the CPI has 168 or 300 monthly observations. So. from this viewpoint, the latter is more suitable for empirical analyses.

Figure 3: Evolution of the annual GDP deflator and of the monthly CPI in Greece (2010 =100), 2010-23



Source: Eurostat (GDP deflator, dated 1.15.2024) and ELSTAT (CPI, dated 10.6.2024), author's own calculations.

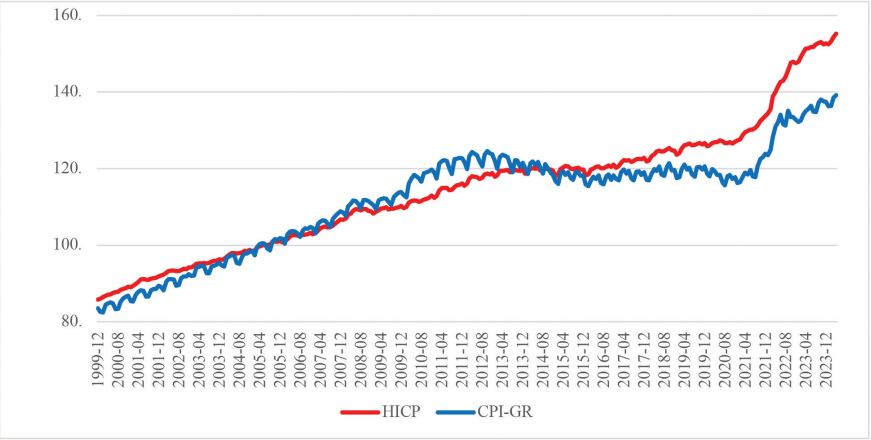
Economic theory and empirical analyses suggest that prices are affected by: (a) Changes in the aggregate supply, such as changes along the inputs-production-sales-and-after sales service support value chain (e.g., changes in input prices, in competition, in markups, in minimum wages). (b) Changes in the aggregate demand, such as changes in monetary or fiscal policy (e.g., in interest rates, tax rates, public spending). (c) Unexpected anomalies in the above (e.g., in the case of war or epidemic) as already mentioned in the Introduction. (d) Seasonal and cyclical features of the above. See Lemos, 2008; Coibion et al., 2015; Petralias and Prodromídis, 2015; Bodnár et al., 2018; Harasztosi and Lindner, 2019; Ferrara et al., 2021; Kouvaras et al., 2021; Caldara et al., 2022; Bernardini and Lin, 2023; Di Giovanni et al., 2023; and the sources cited therein.

Of these likely explanatory factors, the analysis that follows takes into account via binary categorical variables a number of events that took place: the euro-changeover in early 2002, seasonal discounts (mid-season sales periods),[4] the introduction of additional short sales periods in the autumn of 2013 in an attempt to offset consumer losses at a time real income dropped, the cancellation of the said short sales periods in the spring of 2022 at the request of sellers, a dramatic consumer tax increase in the autumn of 2012, the substantial distribution of subsidies to counter the said increase in the autumn of 2014, the pandemic, the war in Ukraine that also coincided with considerable post-pandemic spending by the RRF and other resources.

In the empirical analysis these factors are supplemented by three continuous variables. The first of these is the interest rate associated with overnight credit to banks, a key monetary policy instrument employed by the European Central Bank (ECB). It is in the form of a time-series that runs from January 1999 onwards and is made available by the ECB. The ECB has been in charge of the EU's monetary policy as of 1998. One of its tasks was to put into circulation euro banknotes and coins in January 2002. Another task is to maintain a 2% inflation rate across the eurozone over the medium term. So, the ECB often manipulates the said interest rate with the understanding that, *ceteris paribus*, the rate's rise (or fall) makes borrowing more expensive (or cheaper), resulting in less (or more) money circulating in the market, thus reducing (or raising) the demand for goods and services and bringing about lower (or higher) prices. The price measure considered by the ECB is the Harmonised Index of Consumer Prices (HICP). This is based on a basket of goods and services, representing the consumption of all private households in the member states, and its broad EU-27-wide version frequently moves similarly to the Greek CPI (see Figure 4). However,

4. Only some of the discounts and offers enter the CPI. Especially, reduced prices due to offers or discounts applicable to certain categories of consumers, offers made by making a product available as a gift, offers made through cards or coupons, offers made on products close to their expiration dates, are not considered when calculating the CPI.

Figure 4: Evolution of the HICP and of the Greek CPI (CPI-GR), Dec.1999-Apr.2024 (2005=100)



Source: Eurostat (HICP, dated 31.05.2024), ELSTAT (CPI-GR, dated 10.06.2024), author's own calculations.

the inflation target is not based on the Greek CPI, so changes in the Greek CPI do not systematically precede interest rate changes. See Table 1.

Table 1: Granger causality tests of the null hypothesis that Greek CPI changes do not systematically predict ECB interest rate changes, Jan.1999-May 2024

Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value
1	0.162	8	0.356	15	0.461	22	0.427	29	0.454	36	0.750
2	0.311	9	0.402	16	0.545	23	0.486	30	0.527	37	0.814
3	0.148	10	0.269	17	0.581	24	0.546	31	0.530	38	0.841
4	0.190	11	0.396	18	0.528	25	0.562	32	0.501	39	0.889
5	0.140	12	0.357	19	0.532	26	0.567	33	0.606	40	0.898
6	0.191	13	0.375	20	0.308	27	0.504	34	0.657		
7	0.223	14	0.392	21	0.309	28	0.519	35	0.741		

The probability of error is never small, so there is no evidence against the null hypothesis.
Sources: ELSTAT (CPI data dated 10.06.2024), ECB (interest rate data accessed on 10.6.2024), author's own calculations.

The second continuous explanatory variable employed functions as a policy instrument, too. It is the minimum wage. Unlike the equilibrium wage, which is shaped by labor market forces, the minimum wage is set by the government. It takes the form of a price floor below which employees may not sell their labor. When this floor is set above the equilibrium wage, then, *ceteris paribus*, employment decreases, and output and the aggregate supply fall (e.g. by Begg et al., 2008: 204-206.) While Greece does

not have an automatic wage indexation system for all (abolished in 1990), the minimum monthly wage has gone from € 505.1 in May 1999 to € 968.3 in April 2024 via 22 increments and one reduction (from € 876.6 to € 683.8 in December 2012). At the EU-level an attempt is made to establish a framework for adequate minimum wages across member-states (European Union, 2022), but, as it appears from the Greek CPI and minimum wage time-series,[5] CPI changes systematically precede changes in the minimum wage, perhaps by 25 or 36-37 months, probably by 38-39 months. See Table 2.

Table 2: Granger causality tests of the null hypothesis that CPI changes do not systematically predict minimum wage changes in Greece, Jan.1999-May 2024

Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value	Lags	P-value
1	0.340	8	0.624	15	0.421	22	0.333	29	0.050	36	0.014
2	0.312	9	0.312	16	0.485	23	0.102	30	0.054	37	0.017
3	0.389	10	0.159	17	0.540	24	0.115	31	0.065	38	0.004
4	0.035	11	0.172	18	0.613	25	0.015	32	0.032	39	0.008
5	0.035	12	0.297	19	0.672	26	0.038	33	0.034	40	0.013
6	0.303	13	0.290	20	0.575	27	0.044	34	0.043		
7	0.457	14	0.383	21	0.285	28	0.040	35	0.040		

The probability of error is small (1-2%) at the 25th and 36-37th lag, and very small (less than 1%) only in the last entries of the last column. It is in them that we have the strongest evidence against the null hypothesis.
Sources: ELSTAT (CPI data dated 10.06.2024), ESSE and Country Economy (minimum wages accessed on

The third continuous explanatory variable is the input price index in agriculture, made available by ELSTAT. Its monthly figures run from January 2000 onwards,[6] and are based on the intermediate consumption of goods and services (fertilizers, pesticides, fodder, seeds, energy and lubricants, maintenance and repairs, etc.) and purchase of fixed capital (machinery and equipment, farms, buildings, etc.) used in the production of crops, poultry and livestock commodities for food and fiber. Changes in the index seem to follow changes in the CPI (same direction) with a six-month lag. See Table 3. Interestingly, no such temporal precedence appears in the semi-annual data for at least ten lags (semesters).

5. The latter is constructed here from the relevant tables of the ESSE (2024) *and of the* Country Economy (2024).
6. As a result, a small number of observations is removed.

Table 3: Granger causality tests of the null hypothesis that CPI changes do not systematically predict input price index changes in agriculture in Greece, Jan.2000-May 2024

Lags	1	2	3	4	5	6	7	8	9	10
P-value	0.834	0.354	0.456	0.042	0.018	0.010	0.021	0.027	0.043	0.063

The probability of error is very small (0.0095%) at the 6th lag.
Source: ELSTAT (CPI data dated 10.06.2024; input price index data dated 15.07.2024), author's own calculations.

To the extent the three said variables are affected by the CPI some or several periods later or not at all, it is quite appropriate to explain the patterns of the CPI in terms of concurrent minimum wages and agricultural input prices and slightly earlier (lagged) ECB interest rates.[7]

The analysis is carried out both in terms of levels and in terms of first differences. (See Tables 4A and 4b, respectively.) In the latter, the continuous variables are uncorrelated with one another (the highest correlation coefficient is $\rho < 3\%$). However, this is not the case in the former and, therefore, in order to disentangle the separate influences, in the analysis all three continuous variables are rendered uncorrelated with each other:[8] They are run net (i.e., as residuals) of the other factors−i.e., the factors previously considered in the analysis, to be exact.

In both versions the regressands (the CPI or its first difference, the ΔCPI), their immediate lags, the regressors and the immediate lags of the regressors turn out to be either modestly or negligibly correlated with the respective regression residuals.[9] In addition, the Ramsey Regression Equation Specification Error Tests (RESET) suggest that the models are not missing any non-linear combinations of the explanatory variables, and the overall explanatory power of either model (the R^2 and adj.R^2) turns out to be high.

7. For it may take some time for the impact of the ECB's interest rate to pass through.
8. Thus, the impact of confounding factors and of double counting of common features, such the minimum wage effects on the agricultural cost mix, is prevented. (The correlation coefficient, ρ, between the minimum wage and the input price index in agriculture is equal to 75%).
9. $\rho_{CPIt,ut}$=$\rho_{CPIt-1,ut}$ = 9%, $\rho_{\Delta CPIt,ut}$ = 52%, $\rho_{\Delta CPIt-1,u\ t}$ = 44%, $\rho_{\#10t-3,ut}$ = 3%, $\rho_{\#11t-3,u\ t}$ = -8%, $\rho_{\#12t-2,ut}$ = -3%, $\rho_{\#10't-3,ut}$ = 12%, $\rho_{\#11't-2,ut}$ = 7%, $\rho_{\#12t-3,ut}$ = 8%.

Table 4: Econometric analysis of the monthly CPI in Greece, Jan. 2000 – May 2024 (2020=100)

A. With the CPI as regressand		
1	Autonomous component (initial level)	68.67
2	Autonomous component for the new currency (binary variable, set to one from Jan. 2002 onwards)	13.35
3	Time trend up to the currency changeover (i.e., up to Dec. 2001)	0.20
4	Time trend from Jan. 2002 onwards	0.12
	Seasonal effects (binary variables)	
5	Winter and summer sales: January-February & July-August	-1.97
6	Intermediate sales: November & May (in effect from Nov.2013-May 2021)	-2.42
	The most intense cycle-phases (binary variables)	
7	Jan.2013 (3 months after a 450% tax increase in heating oil) [a] – Oct.2014 (subsidy distribution)	4.72
8	Apr.2020 (1 month after the pandemic's first lockdowns in Greece) – Jan.2022 (¾ of adults vaccinated so restrictions were lifted)	-7.34
9	Feb. 2022 (Russian invasion of Ukraine, energy crisis etc.; considerable public spending)	2.55
	Other factors (binary variables)	
10	Minimum wage as a residual (i.e., net) of all previous factors, from Jan. 1999 onwards	0.04
11	ECB marginal lending rate to banks (3 lags) as a residual (i.e., net) of all previous factors, from Mar. 1999 onwards	-0.43
12	Input price index in agriculture as a residual (i.e., net) of all previous factors	0.36
	N = 293. R^2 = 99.3%. adj. R^2 = 99.2%. Ramsey RESET p-value = 17.1%.	
B. With the ΔCPI (first differences of the CPI) as regressand		
1′	Autonomous component	0.17
2′	Introduction of new currency (binary variable, set to one for Jan. 2002)	0.29
	Seasonal effects (binary variables)	
3′	Winter and summer sales: January-February & July-August	-1.05
4′	Intermediate sales: November & May (in effect from Nov.2013-May 2021)	-0.91
5′	March, April, September	1.35
	Other temporal effects - cycle-phases (binary variables)	
6′	Jan.2013 (3 months after a 450% tax increase in heating oil) [a]	0.68
7′	Oct.2014 (outset of considerable distribution of heating oil subsidies)	-0.01
8′	Apr.2020 (1 month after the pandemic's first lockdowns in Greece)	-1.81
9′	Feb. 2022 (Russian invasion of Ukraine, energy crisis etc.; considerable public spending)	1.28
	Other factors (first differences of continuous variables)	
10′	Minimum wage	0.01
11′	ECB marginal lending rate to banks (3 lags)	-0.18
12′	Input price index in agriculture	0.22
	N = 292. R2 = 72.8%. adj. R2 = 71.7%. Ramsey RESET p-value = 7.6%.	

[a] An indirect tax increase affects the economy not when it is levied, but when a good number of consumers purchase the product on which the tax was levied or turn to its substitutes. In this case, the 4th quarter of 2012 in Attica (the most populous region of Greece) was both warmer than the quarter that followed, and warmer than the 4th quarters of 2011 and 2013. This means that, in all likelihood, the purchase of large quantities of heating oil was postponed for a few months.

The analysis is carried out with robust standard errors. The p-values associated with coefficients #2́, 6́, 7́, 10́, 11́ are equal to 0.025, 0.324, 0.964, 0.037, 0.417, respectively, and the rest equal zero. However, p-values are only useful in sample-based analyses. The present analysis is not based on samples.

Sources: ELSTAT (CPI data dated 10.06.2024, input price index data dated 15.07.2024), ECB (lending rates from 1999 on, accessed on 10.6.2024), ESSE and Country Economy (minimum wages accessed on 28.06.2024), own calculations.

4. Econometric findings

The econometric analysis of the monthly CPI from 2000 to May 2024 (in Table 4A) suggests that prices:

- Increased over time, rose further during (or very shortly after) the currency changeover, and continued to increase over time (rows 2-4). By and large, this upward trend is in line with the ECB target of a small positive inflation rate over the medium term.
- Feature both seasonal and cyclical elements: (a) Systematically decreased during the winter and summer sales (in January-February and July-August) and during the short (intermediate) autumn and spring sales (in November and May, respectively) that run from the autumn of 2013 to the spring of 2022 (rows 5-6). Restoring these elements is an option if policymakers wish to alleviate inflation. (b) Increased considerably (above the trend) after a 450% tax hike on heating oil in 2012 up to the distribution of subsidies to a large share of the consumer base in 2014 (row 7). (c) Decreased considerably (below the trend) in the spring of 2020 when the coronavirus pandemic reached Greece (row 8). (d) Increased considerably from the time of the Russian invasion of Ukraine in late winter of 2022 onwards (i.e., with the international sanctions against Russia's energy products and increased demand for substitutes, as well as the inflow of substantial RRF resources, see row #9).
- Moved in the same direction as the minimum wage and the prices of agricultural inputs (see rows 10 and 12) and in the opposite direction of the ECB interest rate (row 11).

The econometric analysis of the CPI in terms of first differences (Table 4B), also features parts:

- below the trend: seasonally during sales (rows 3′-4′), also after the heating oil subsidy distribution (row 7′) and in the wake of the first pandemic lockdowns (row 8′), as well as
- above the trend: seasonally in March-April and September (row 5′), also after the heating oil tax increase (row 6′) and the Russian invasion of Ukraine that coincided with considerable public spending (row 9′).

It also indicates that the CPI changes in the same direction as the minimum wage and the prices of agricultural inputs change (rows 10′ and 12′), and in the opposite direction of the ECB interest rate change (row 11′).

Consequently, if policy makers wish to reduce inflationary pressures, they have a range of options: to re-establish the short autumn and spring sales, to refrain from

indirect tax and minimum wage increases and to provide subsidies to low-income residents and those in need, to reduce government spending, to affect the reduction of agricultural input prices. In fact, it may be more effective to try several of the above together.

5. The evolution of various consumer price sub-indices

To gain insights into the evolution of monthly prices at a more disaggregated product level (across major groups of goods and services), Table 5 displays the estimated respective trend, seasonal and currency-changeover effects, as well as effects associated with the intense cycle-phases identified in Table 4. The finding suggest that:

- Prior to the changeover, prices in hotels-cafés-restaurants reached the highest upward trend, and only prices in communications showed a downward trend (row 3). Then, during or shortly after the currency changeover prices in all categories, especially in education, rose, and only prices in communications dropped (row 2). Subsequently, prices in nearly all categories, especially in alcoholic beverages-tobacco, presented upward trends, prices in communications and in recreation-culture downward trends, while prices in durable goods etc. negligible change (row 4).
- During summer and winter sales and March, prices in clothing-footwear fell considerably (column 3).
- During the heating oil tax hike prices increased, primarily in housing, followed by transport, clothing-footwear, and miscellaneous goods and services, etc. (row 7).
- During the pandemic prices decreased considerably in nearly all categories, especially in housing, not so much in food etc., and rose little in communications (row 8).
- During the (ongoing) war in Ukraine and the influx of RRF resources, food prices rose considerably, followed by transport prices, while alcoholic beverages-tobacco prices fell considerably followed, by education and miscellaneous goods-services prices (row 9).

To the extent the downward price trend in communications stands out, it might be worth to consider introducing in more sectors of economic activity, a policy planning and development agency that also operates as competition authority ─similar to the case of the communications sector.

6. Discussion

The current inflation is to some extent an integral part of the ongoing economic boom, and insofar as the real per capita product is rising, the situation is preferable to that of a recession. However, of the four paths that the economy can take, the most advantageous one in terms of real output and prices is that dominated by a rightward shift of the aggregate supply. This may be achieved:

Table 5: Estimates of the trend and seasonal effects, and of the effects of the cyclical features identified in Table 4 on the monthly CPI components in Greece, Jan. 2000 – May 2024 (2020=100)

	Variables (numbered as in Table 1)	Food, non alcoholic beverages (1)	Alcoholic beverages, tobacco (2)	Clothing, footwear (3)	Housing (4)	Durable goods, household appliances & services (5)	Health (6)	Transport (7)	Communications (8)	Recreation, culture (9)	Education (10)	Hotels, cafés, restaurants (11)	Miscellaneous goods & services (12)
1	Initial level	66.62	40.26	88.37	55.91	95.66	70.10	63.78	125.93	91.49	74.67	59.34	82.42
2	Using € (from 2002 on)	13.25	6.06	16.61	12.05	14.72	17.10	7.97	-27.18	18.86	22.05	16.11	18.82
3	Trend up to Dec.2001	0.19	0.19	0.11	0.18	0.15	0.18	0.19	-0.56	0.18	0.22	0.23	0.21
4	Trend subsequently	0.11	0.26	0.04	0.21	-0.00	0.08	0.17	-0.01	-0.01	0.05	0.13	0.04
	Seasonal effects												
	• January	0.57	0.11	-17.11	-0.56	-2.55	-0.36	-0.45	0.54	-0.69	-0.73	-0.29	-0.93
	• February	0.28	0.03	-26.32	-1.03	-4.49	-0.37	-0.28	0.38	-0.84	-0.89	-1.12	-1.41
	• March	0.35	-0.04	-5.86	-0.75	-0.99	-0.26	0.86	0.23	-0.71	-0.96	-1.00	-0.72
	• April	0.80	0.39	-0.62	-0.21	-0.53	0.08	1.59	0.28	-0.32	-0.73	-0.04	-0.13
	• May	0.66	0.74	-4.08	-0.46	-0.64	0.18	1.94	0.36	-0.44	-0.80	0.02	-0.26
	• June	-0.23	0.81	-0.96	-0.45	-0.37	-0.15	2.49	0.45	-0.54	-0.97	-0.19	-0.57
	• July	-1.27	0.78	-16.82	-0.58	-2.87	-0.12	2.54	0.49	-0.65	-1.04	-0.22	-1.02
	• August	-1.14	0.56	-23.81	-0.61	-4.17	-0.04	1.98	0.62	-0.73	-1.11	-0.30	-1.15
	• September	-0.72	0.57	-1.15	-0.45	-0.41	0.05	1.29	0.62	-0.47	-0.03	0.00	-0.54
	• October	-0.34	0.49	0.43	-0.29	-0.15	0.08	1.07	0.60	-0.32	0.04	-0.21	-0.45
	• November	-0.16	0.44	-3.65	0.49	-0.27	-0.01	0.62	0.46	-0.25	0.10	-0.51	-0.31
	• December (ref.)												
	In the intense cycle phases												
7	Jan.2013-Oct.2014	2.11	2.59	6.63	16.71	3.25	0.10	6.66	-3.61	2.33	2.92	0.72	6,62
8	Apr.2020-Jan.2022	-3.89	-7.60	-8.20	-12.35	-9.11	-5.85	-9.12	2.56	-7.28	-7.52	-6.28	-11,33
9	Feb.2022 onwards	14.57	-10.76	0.01	3.18	2.78	-2.59	5.86	-1.74	-3.27	-5.25	1.14	-7,63
N: 305	R^2:	94,43%	98.61%	75.03%	92.05%	48.22%	84.02%	92.07%	84.63%	55.64%	60.61%	94.95%	58.72%

The analysis is carried out with robust standard errors. Regarding p-values: P-values are only useful in sample-based analyses. This analysis is not based on samples. However, the p-values are provided below per column for those readers who wish to view them: (1) 0, 0, 0, 0, 0.536, 0.761, 0.708, 0.384, 0.473, 0.808, 0.171, 0.22, 0.44, 0.717, 0.863, 0.005, 0, 0. (2) 0, 0, 0, 0, 0.87, 0.97, 0.95, 0.578, 0.289, 0.249, 0.263, 0.425, 0.414, 0.488, 0.526, 0, 0, 0. (3) 0, 0, 0.325, 0, 0, 0, 0.003, 0.751, 0.038, 0.626, 0, 0, 0.56, 0.83, 0.064, 0, 0, 0.997. (4) 0, 0, 0.051, 0, 0.734, 0.533, 0.648, 0.899, 0.781, 0.787, 0.726, 0.713, 0.784, 0.86, 0.766, 0, 0, 0.036. (5) 0, 0, 0.067, 0.886, 0.074, 0.002, 0.49, 0.712, 0.655, 0.8, 0.046, 0.004, 0.774, 0.917, 0.853, 0.005, 0, 0.035. (6) 0, 0, 0.004, 0, 0.745, 0.74, 0.816, 0.944, 0.875, 0.898, 0.918, 0.969, 0.966, 0.946, 0.992, 0.909, 0, 0.012. (7) 0, 0, 0.009, 0, 0.727, 0.825, 0.5, 0.212, 0.128, 0.053, 0.049, 0.124, 0.317, 0.407, 0.629, 0, 0, 0. (8) 0, 0, 0, 0, 0.494, 0.636, 0.774, 0.723, 0.654, 0.578, 0.542, 0.441, 0.437, 0.45, 0.566, 0, 0.001, 0.018. (9) 0, 0, 0.015, 0.009, 0.587, 0.509, 0.579, 0.805, 0.733, 0.677, 0.615, 0.574, 0.715, 0.804, 0.845, 0.025, 0, 0.006. (10) 0, 0, 0.047, 0, 0.698, 0.637, 0.611, 0.698, 0.671, 0.61, 0.584, 0.56, 0.987, 0.983, 0.958, 0.057, 0, 0.003. (11) 0, 0, 0, 0, 0.74, 0.204, 0.256, 0.963, 0.983, 0.828, 0.802, 0.732, 0.996, 0.81, 0.561, 0.312, 0, 0.161. (12) 0, 0, 0.038, 0, 0.587, 0.411, 0.676, 0.941, 0.878, 0.744, 0.557, 0.505, 0.753, 0.796, 0.858, 0, 0, 0.

Source: ELSTAT (CPI components, dated 10.06.2024), author's own calculations.

- by retaining workers past retirement, upgrading workforce skills to fill job vacancies or inviting people who have the necessary skills and competencies from overseas;
- by removing obstacles to start ups, and by facilitating research and development, technological improvement, the accumulation and diffusion of knowledge to producers and workers, and the creation of more value in all production phases and after production;
- by producing exportable goods and services that appeal to high income foreign markets;
- through improvements in private sector (business) strategic development planning and management practices, and by stimulating healthy competition in as many domestic sectors of economic activity as possible,[10] while allowing natural monopolies to produce large quantities at low cost in the remaining sectors;
- by avoiding practices that restrict the aggregate supply (e.g., increases in minimum wages), and offering instead other types of support (e.g., subsidies) that do not reduce employment;
- by reducing employer contributions and income taxation so as to raise employment and production, as long as this does not compromise macroeconomic stability and fiscal sustainability.[11]

And if policy makers wish to further reduce price inflation, they can opt to re-establish the short autumn and spring sales, refrain from indirect tax increases, affect the reduction of agricultural input prices by encouraging practices that promote more efficient uses of resources and coordinated bulk purchasing or by helping raise the supply of (domestically made and imported) inputs and farmers' access to relevant information and to networks of distribution-transportation, and so on.

7. Conclusion

The ECB, through its monetary policy tools, will bring the inflation of the Eurozone to the level it desires (around 2%). Understandably, individual countries may deviate from the average to different extents. To the degree Greece needs to catch up (converge) fast to the rest of the EU-27, carrying out additional expenditures so at to upgrade the country's production capacity, energy production-distribution-storage, and functional integration, the aggregate demand schedule is bound to shift to the right.

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10. As opposed to repealing such deregulation (e.g., the 2018 annulment of the 2014 fixed book price amendment). See Kontolaimou et al. (2019) and Prodromidis (2020).

11. See Cloyne et al. (2023). While the imposition of taxes reduces production, hence, the aggregate supply (e.g., by Begg et al., 2008: 70-71), removing taxes does not necessarily restore things to their original state of affairs. Especially the reduction of indirect taxes requires extra attention. See Benzarti et al. (2020).

This will impede the reduction of prices affected by the proposed move of the aggregate supply schedule to the right. So, every single additional idea or plan regarding the reduction of prices will have to be considered: From bringing back mid-season sales and refraining from indirect taxation and minimum wage increases, to providing subsidies instead (preferably subsidies to goods and services associated with large multipliers), affecting the reduction of agricultural inputs prices, monitoring sectors that purposely keep prices high to boost profits and introducing competition in these sectors, even questioning the EU Commission's tool that raises the prices of imports. Studies that explore other aspects may offer additional recommendations, but the ones listed above are good places to start.

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