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Unconventional Fiscal Policies in Response to Inflation: The Iberian Exception in Portugal

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ABSTRACT

The surge in Eurozone inflation in 2022 compelled European governments to implement unconventional fiscal policies. One initiative, the Iberian Exception, imposed a cap on the cost of natural gas used for electricity generation in Portugal and Spain. Using a Bayesian Vector Autoregressive model combined with Bayesian Dynamic Forecasting, we predict a 3.14 p.p. in energy inflation from July 2022 to December 2023. The effect was asymmetric over time, given the structure of contracts and hedging mechanisms within the Iberian Electricity Market. The results highlight the effectiveness of unconventional fiscal policies for managing supply-driven inflationary pressures.

JEL Classification: C53, E31, Q41, Q48

1 | Introduction

In recent years, food and energy costs surged in Europe due to the pandemic and the Russia-Ukraine conflict (Heussaff et al. 2022). With inflation in the Eurozone increasing from 2.6% in 2021 to 8.4% in 2022 (ECB 2023), the stability of prices was at risk. In response, the European Central Bank (ECB) gradually raised key interest rates from July 2022 (Lane 2022). However, given inflation's primarily supply-driven nature (Bańbura et al. 2023; De Santis 2024; Gonçalves and Koester 2022; Serra and Quelhas 2023), monetary policy alone was insufficient to stabilize prices and protect economic activity. To complement the ECB's efforts, governments and the European Commission resorted to fiscal measures, particularly unconventional policies aimed at mitigating the impact of energy prices on production costs and real disposable income (Hidalgo-Pérez et al. 2024).

Unconventional fiscal policies influence disposable income not by adjusting taxes in the usual way but by intervening directly through mechanisms like price controls or cost adjustments, helping to manage economic conditions such as high inflation. The term was first introduced by Correia et al. (2013) to describe a specific class of policies, namely, time-varying consumption taxes designed to replicate the effects of negative nominal interest rates in zero-lower-bound environments. Although their setting differs fundamentally from the one considered here, their contribution initiated a broader research agenda on fiscal instruments that depart from standard tax-and-transfer policy. The concept was later redefined by Dao et al. (2023), who viewed them as expansionary tools to address post-2022 inflation. In the Eurozone, between 2022 and 2023, various unconventional fiscal measures were implemented, including energy tax cuts, transfers, subsidies, and price caps (Dao et al. 2023; Prammer and Reiss 2023).

Among these, the Iberian Exception stands out as a joint measure adopted by Portugal and Spain and applied to the Iberian electricity market (MIBEL). Introduced in June 2022, this mechanism aims to reduce wholesale electricity prices by capping the cost of natural gas used in power generation to benefit industrial and residential consumers while also reducing energy production costs.

Most studies on the Iberian Exception have focused primarily on Spain (Hidalgo-Pérez et al. 2024; Robinson et al. 2023), with only Ruiz et al. (2024) looking at both countries. They found a near-zero effect on headline inflation but a 6% average reduction in energy inflation by June 2023. However, their study did not cover the full duration of the policy and employed synthetic control methods, comparing Portugal to other countries that had also implemented fiscal measures to combat inflation, raising concerns about the validity of the methodology. More critically, while Spain's energy market has been extensively studied, Portugal's energy profile remains less explored, providing an interesting context to examine.

In 2021, renewable energy sources accounted for 59% of Portugal's electricity consumption, a much higher proportion than Spain's 47%.[1] This structural difference in energy profiles may lead to distinct ways in which the Iberian Exception affects energy inflation in both countries. In Portugal, the higher share of renewable energy, particularly wind and hydropower, means that the price cap on natural gas may have had a relatively smaller impact on electricity prices compared to Spain, where fossil fuels, especially natural gas, remain central to electricity generation. The greater reliance on renewables in Portugal could have also moderated the intended effects of the policy, as the overall exposure to natural gas price fluctuations is reduced. As a result, the Iberian Exception may have operated under different conditions in Portugal than in Spain, highlighting the need to examine how the policy influenced energy inflation in Portugal. This analysis not only contributes to assessing the effectiveness of the Iberian Exception in mitigating energy price inflation but also provides insights into the role of national energy profiles in shaping the outcomes of fiscal policies.

This paper contributes to the literature by using a Bayesian Dynamic Forecast to predict the effect of the Iberian Exception on energy inflation in Portugal over the course of the policy. Unlike previous studies that rely on cross-country comparisons, we employ a Bayesian Vector Autoregressive (BVAR) model that focuses exclusively on Portugal's energy prices. This approach eliminates the complexities of international comparisons and allows for a more precise analysis of country-specific dynamics. Furthermore, by covering the full duration of the policy, our study ensures a comprehensive and reliable assessment of its effects over time. In doing so, we add to the empirical literature on the role of unconventional fiscal policies in mitigating inflationary pressures in energy markets. The results indicate that the Iberian Exception was effective in reducing energy inflation, leading to an average decline of 3.14 percentage points (p.p.) between July 2022 and December 2023. During the 18 months that the policy was in place, its effects on energy inflation varied, most likely as a result of changes in market conditions and delays in cost pass-through. Despite its change over time, the Iberian Exception played a significant role in curbing energy inflation in the short to medium term. Besides, our findings indicate that the BVAR approach produces results consistent with the synthetic control method, eliminating the need to use data from other countries for control construction.

This work is organized as follows. Section 2 reviews the relevant literature. Section 3 presents the evolution of inflation in Portugal and the Eurozone, and Section 4 focuses on the Iberian Exception. Section 5 outlines the empirical methodology, including the econometric approach and the data used. In Section 6, we estimate the BVAR for the pre-policy period, and the results are analyzed in Section 7. Section 8 concludes the study.

2 | Literature Review

The global financial crisis of 2008 and subsequent economic downturns triggered a fundamental reassessment of macroeconomic policy, particularly the interaction between monetary and fiscal policy. Traditional frameworks that emphasized monetary dominance, inflation targeting, and limited fiscal discretion have been challenged by the constraints of monetary policy at the zero lower bound and the need for active fiscal intervention during severe recessions. Blanchard et al. (2010) and Blanchard et al. (2013) argue for a more flexible and integrated approach to economic stabilization, standing up for stronger countercyclical fiscal policies, higher inflation targets, and a more nuanced policy mix beyond conventional macroeconomic tools. Similarly, Auerbach and Gorodnichenko (2012) highlight the role of state-dependent fiscal multipliers, demonstrating that fiscal interventions are significantly more effective during downturns than in stable economic periods. These findings suggest that unconventional fiscal policies, when properly designed, can play a crucial role in mitigating economic fluctuations.

This shift in perspective has led to increased interest in alternative fiscal policy approaches that extend beyond traditional spending and taxation. Turner (2017) explores the case for the monetary financing of fiscal deficits, where central banks directly support government expenditures, effectively blurring the lines between fiscal and monetary policy. Other studies discuss fiscal devaluation strategies, such as shifting tax burdens to improve competitiveness, and targeted fiscal stimulus, including direct cash transfers and sector-specific subsidies, which can enhance the effectiveness of fiscal interventions (Boehm et al. 2025; Farhi et al. 2013; Sahm 2019). These approaches reflect a growing consensus that fiscal multipliers, particularly in crisis conditions, are stronger than previously assumed, necessitating a reassessment of the role of fiscal policy in macroeconomic stabilization.

2.1 | The Concept of Unconventional Fiscal Policies

Unconventional fiscal policies are a relatively recent addition to the economic literature. Although unconventional monetary policies have been extensively studied and formalized, there is no widely accepted theoretical definition of unconventional fiscal measures. The term was first introduced by Correia et al. (2013) to describe policies that replicate the effects of negative nominal interest rates through specific tax trajectories and temporary fiscal incentives in zero-lower-bound environments. Since then, the concept has evolved to encompass a wider set of fiscal interventions. Later studies refined the definition. D'Acunto et al. (2018) emphasize future announced increases in consumption taxes as a means to stimulate spending and economic activity. More recently, Dao et al. (2023) expanded the scope of unconventional fiscal policies to include expansionary fiscal measures adopted in response to the post-2022 inflationary shock, particularly those aimed at mitigating the effects of rising energy prices.

Unconventional fiscal policies are often categorized according to several criteria (Arregui et al. 2022; Checherita-Westphal et al. 2022; Dao et al. 2023; Ferdinandusse and Delgado-Téllez 2024; Prammer and Reiss 2023). One common distinction is between targeted measures, which focus on specific groups, and untargeted measures, which affect the broader population. Another classification differentiates between price suppressing measures, which distort market prices (e.g., energy tax reductions) and non-price suppressing measures, which do not interfere with relative prices (e.g., direct transfers to households). Additionally, policies can be divided into demand-side measures, which stimulate aggregate demand through mechanisms like monetary transfers or tax cuts on consumer goods, and supply-side measures, which aim to reduce production costs through subsidies or tax reductions on business inputs.

2.2 | Unconventional Fiscal Policies in Portugal

Between 2022 and 2023, the governments of the Eurozone implemented a broad range of unconventional fiscal policies to address the inflationary shock. These measures included reductions in energy taxes, direct monetary transfers, sector-specific subsidies, and price ceilings (Dao et al. 2023; Prammer and Reiss 2023). In Portugal, these policies represented a significant fiscal cost and included reductions in the ISP (tax on petroleum products), temporary VAT exemptions on essential foods (zero VAT), and direct financial support for vulnerable households and specific sectors. Research by Quelhas et al. (2024) finds that the zero VAT policy effectively lowered food prices, contributing to a 0.7 percentage point reduction in inflation.

A particularly notable measure in Portugal and Spain was the Iberian Exception, a joint initiative designed to cap the price of natural gas used in electricity generation. This policy can be classified as a price-suppressing measure, directly targeting electricity prices. It also exhibits characteristics of a partially targeted measure, as it primarily benefits industrial and domestic consumers with the highest exposure to the electricity market. In addition, it functions as a supply-side policy, reducing production costs for energy companies. Several studies have attempted to quantify the impact of the Iberian Exception. Most of the research has focused on its effects on wholesale electricity prices in Spain (Hidalgo-Pérez et al. 2024; Robinson et al. 2023). However, only Ruiz et al. (2024) have assessed its impact on inflation in both Portugal and Spain. Using a synthetic control approach, they estimate that the policy led to a near-zero effect on overall inflation but contributed to a 5.98% reduction in energy inflation by June 2023. The scope of this analysis is nevertheless shaped by data and methodological constraints. In particular, the synthetic control approach requires cross-country comparability that may be difficult to achieve in a context characterized by substantial heterogeneity in national energy policies and market structures across Europe. These differences complicate the construction of a credible control for Portugal and may limit the external validity of cross-country comparisons.[2]

2.3 | Contributions to the Literature

This paper contributes to the literature by assessing the impact of the Iberian Exception on inflation in Portugal. Our approach differs in several key ways.

First, we employ a Bayesian Vector Autoregression (BVAR) model specifically tailored to Portugal's energy prices. Unlike the synthetic control method used by Ruiz et al. (2024), which assumes comparability between countries with distinct energy policies and market structures, our method avoids the pitfalls of cross-country heterogeneity and provides a more robust country-specific analysis. By isolating the dynamics within Portugal, we account for domestic policy interactions, energy market characteristics, and inflationary trends that may not be captured in broader European studies.

Second, this study covers the entire duration of the Iberian Exception, whereas prior research has often been limited to partial time frames. Given that the effects of fiscal policies can evolve over time, our extended period of analysis allows us to capture both short-term and longer-term inflationary impacts, providing a more complete picture of the policy's effectiveness.

Third, this study offers new empirical evidence on the role of unconventional fiscal policies in an inflationary environment. Much of the literature on unconventional fiscal measures has focused on recessions and demand stimulation; our research evaluates their function in mitigating inflation, particularly in energy markets. In doing so, we contribute to the broader debate on how fiscal interventions can be designed to balance economic stabilization objectives in periods of high inflation.

3 | Inflation in Portugal and in the Eurozone

Price stability is a cornerstone of the Economic and Monetary Union, with the Eurozone's primary monetary objective being to maintain a 2% inflation rate in the medium term. However, this stability came to an end in 2021, when inflation rose to 2.6%, peaking at 8.4% in 2022 (ECB 2023). Inflation in Portugal closely followed the trend of the Eurozone, with no significant differential.

The increase in energy costs was a major feature of this period of inflation. Initially fueled by the post-pandemic recovery, it became worse after Russia invaded Ukraine in 2022. Commodity prices increased as a result of this conflict, which also upset energy supply chains. Beyond energy-specific factors, inflationary pressures were reinforced by rising wages, increased profit margins, the depreciation of the euro, and food price surges (BdP 2023; ECB 2023).[3] Given the supply-side nature of inflation in 2021 and 2022 (Bańbura et al. 2023; De Santis 2024; Gonçalves and Koester 2022; Serra and Quelhas 2023), policymakers adopted a mixed approach, combining restrictive and expansionary measures to restrain it.

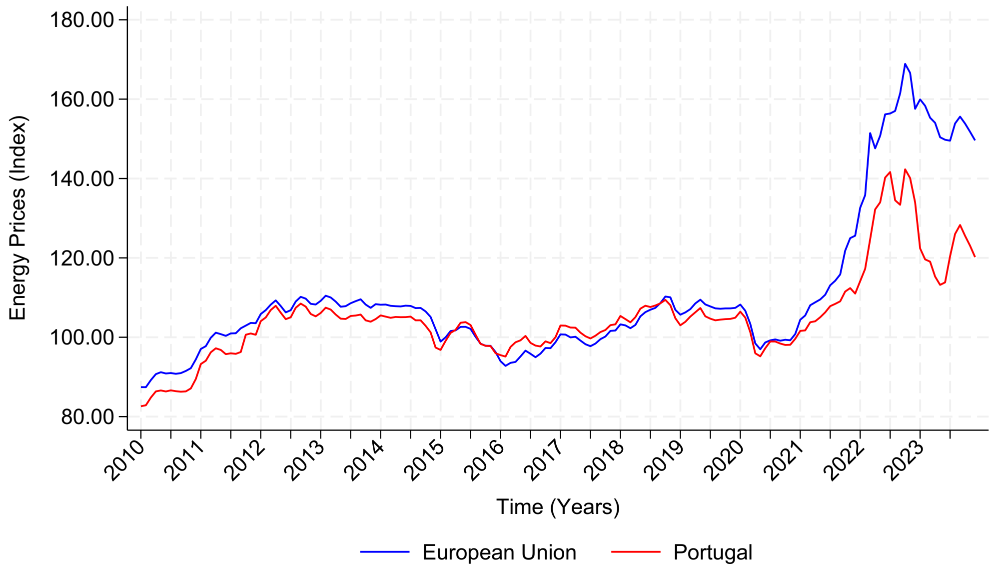

FIGURE 1 | Energy prices evolution (2010–2023). *Source:* FRED (Federal Reserve Economic Data).

To prevent inflation expectations from becoming unanchored, the ECB phased out its Asset Purchase Programme and began raising interest rates in July 2022 (Lane 2022). However, given the supply-driven nature of inflation, fiscal interventions were also crucial.

As highlighted by Stiglitz and Regmi (2023), effective policies are needed to address the root causes of inflation. This led to the adoption of unconventional fiscal policies (Dao et al. 2023), a set of targeted fiscal measures designed to control inflation while safeguarding households and businesses (Stiglitz and Regmi 2023). In Portugal and Spain, the need to curb energy inflation to control underlying inflation, along with the fact that both countries share an integrated electricity market, led to the creation of the Iberian Exception.

Next, we examine how Portugal's energy prices have evolved in relation to the EU and how this and the behavior of the country's energy inflation components.

3.1 | The Evolution of Energy Prices in Portugal and the European Union

Figure 1 compares the evolution of energy prices in Portugal and the EU average since 2010. In the aftermath of the financial crisis, energy prices in Portugal fell below the EU average, reflecting weaker domestic demand and unresponsive economic activity. From 2015 onward, prices in Portugal began to recover significantly, narrowing and eventually reversing the earlier gap.

Energy markets experienced exceptional volatility during the COVID-19 pandemic. In 2020, mobility restrictions and reduced economic activity triggered a sharp collapse in global energy demand, pushing crude oil prices to multi-decade lows and European gas benchmarks to historically depressed levels (IEA 2021). Wholesale electricity prices across the EU mirrored these developments. Portugal closely followed this pattern: retail fuel prices declined markedly, and wholesale prices in the MIBEL market fell substantially, although fixed components in retail tariffs mitigated the immediate pass-through to consumers.

The situation reversed rapidly in 2021 as global economic activity recovered unevenly, and supply constraints persisted. European gas prices increased more than fivefold during the year, driving wholesale electricity prices upward. Portugal was particularly exposed due to its limited interconnection capacity and the marginal role of gas in electricity generation. According to Eurostat, retail prices adjusted more gradually but contributed substantially to energy inflation by late 2021.

From 2021 onwards, there was a drastic increase in energy prices within the EU, but the increase in prices in Portugal was more moderate comparatively. From mid-2022, Portuguese prices started to drop at a faster rate than the EU average, thus resulting in a wider gap between the two price series, coinciding with the implementation of the wholesale electricity price cap under the Iberian Exception, suggesting that this policy was important in shielding domestic consumers from the most extreme price increases.

3.2 | Energy Inflation and Its Components in Portugal

While aggregate energy prices provide an overview of the inflationary pressures faced by households, a closer examination of energy inflation requires disaggregating its main components. Figure 2 decomposes energy inflation in Portugal into its elements over the period 2019–2023.

Two main features emerge. First, energy inflation increases sharply during 2021 and 2022, coinciding with the peak of the global energy crisis. Second, gas prices saw a sharp spike, highlighting Europe's dependence on this resource. In the Portuguese particular case, it is responsible for a significant amount of the nation's electricity generation, accounting for

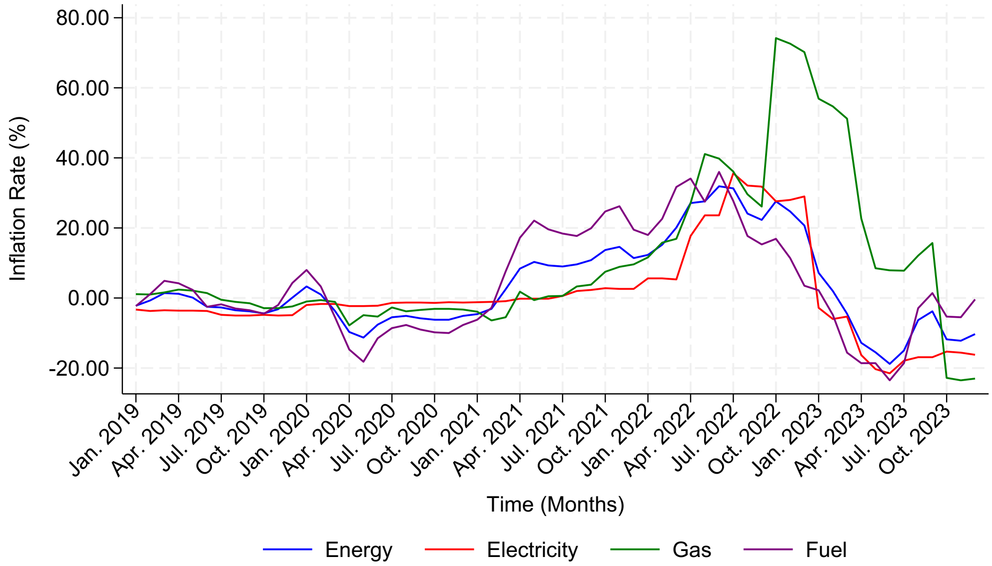

FIGURE 2 | Energy inflation and its components in Portugal (2019–2023). *Source:* Eurostat.

35.6% in 2022 and 21.3% in 2023 (compared to 29.4% and 22.5% in Spain, respectively).[4]

4 | The Iberian Exception

The Iberian Electricity Market (MIBEL), which was put into practice in July 2007, operates as part of the single European electricity market, allowing consumers in Portugal and Spain to buy energy in an environment of free competition, regardless of the location of the producer or supplier. In both countries, the price of electricity is heavily influenced by the cost of natural gas, since gas-fired power stations play a key role in its production.

The Iberian Exception, established by Decree-Law 33/2022 in Portugal[5] and Royal Decree-Law 10/2022 in Spain, implemented a temporary and exceptional mechanism to adjust electricity production costs in MIBEL, considering the specificity of the Iberian market and the limited electricity interconnection with the rest of continental Europe. To mitigate the impact of sharp and unpredictable fluctuations in gas prices for electricity production, the mechanism established a price ceiling for natural gas. This means that even if the market price of gas increases significantly, the cost considered to calculate the price of electricity does not exceed this limit. As a result, consumers benefit from greater stability and predictability in their electricity bills.

The starting cap was defined at €40/MWh for the first 6 months of application, being supposed to gradually increase by €5/MWh each month starting in the seventh month and reaching €70/MWh by the twelfth month. With the extension of the measure, the ceilings rose by €1.10/MWh each month, starting at €56.10/MWh in April 2023 and reaching €65/MWh by December 2023.

A compensation system has been set up to ensure that the imposed limit does not harm producers (mainly gas-fired power plants). This system calculates daily the difference between the real price of gas and the established ceiling,[6] known as the adjustment cost, paid by the consumers who most directly benefit from this limitation on the price of gas, that is, the ones with contracts indexed to the daily market. The difference should also be charged to consumers with fixed-price contracts signed from the end of April 2022, as well as those with contracts already indexed to the Iberian electricity market.

4.1 | The Iberian Exception Versus Other Domestic Measures

Beyond the Iberian Exception, the Portuguese government adopted a set of domestic policy measures aimed at mitigating the impact of the 2022 rising energy prices on households. These interventions focused on three main policies. First, the government repeatedly adjusted, on a monthly (and at times weekly) basis, fuel taxation through temporary ISP (*Imposto sobre os Produtos Petrolíferos*) reductions, implementing a dense sequence of orders to recalibrate fuel taxes, effectively replacing the standard fuel-tax schedule with a highly responsive alternative regime. In parallel, the VAT rate on electricity was temporarily lowered from the intermediate rate (13%) to the reduced rate (6%) through legislative amendments that were subsequently extended. Furthermore, the carbon tax was frozen by suspending its automatic quarterly updates through successive government orders. Taken together, these measures directly affected consumer energy prices by reducing fuel and electricity taxation and by preventing further tax-driven increases.

Unlike the Iberian Exception, domestic tax-based interventions were short-lived, frequently revised, and reactively adjusted to international energy price developments, resulting in a volatile and unpredictable policy environment. By contrast, the Iberian Exception was implemented through a single comprehensive decree-law, subject to only one major extension, and operated within a clearly defined institutional framework shaped by its transnational nature and European Commission approval. This supranational oversight constrained discretionary revisions and delivered a comparatively stable and coherent intervention, making the Iberian Exception the most suitable policy to analyze empirically as a mechanism affecting energy price formation.

5 | Empirical Methodology and Data

An empirical investigation will be carried out to measure the influence of the Iberian Exception on energy inflation (the factor that contributes most to global inflation) during the entire period the policy was in effect.

5.1 | Econometric Methodology

Structural forecasting models face difficulties in identifying equations and depend on estimating future exogenous variables, making them unsuitable for forecasting. The Vector Autoregressive (VAR) model appears as a good alternative approach, using historical data and past regularities in the data to predict future values. It approximates the reduced form of complex structural models, making it a more practical option for forecasting. Sims (1980) defines an unrestricted VAR model with p lags as follows:

$$Y_t = c + A_1 Y_{\{t-1\}} + A_2 Y_{\{t-2\}} + \ \dots \ + A_p Y_{\{t-p\}} + \ \epsilon_t, \quad t = 1, \quad \dots, \ T \tag{1}$$

where $Y_t = \left(y_{1t}, y_{2t}, \ \dots, y_{nt}\right)'$ is a $(n \times 1)$ vector of endogenous variables selected through economic theory, $c = \left(c_1, c_2, \ \dots, c_n\right)$ is a $(n \times 1)$ vector of intercepts, A_p are the $(n \times n)$ coefficient matrices and ϵ_t is a $(n \times 1)$ error vector, following a white noise process.

In VAR models with multiple variables, each variable is estimated using separate equations. This often results in many coefficients, especially when the same lag length is applied across all variables. Consequently, this can lead to overparameterization, causing multicollinearity and a reduction in degrees of freedom, which may lead to large forecast errors. One way to address the issue is to use the Bayesian Vector Autoregression (BVAR) method, as demonstrated by Todd (1984) and Spencer (1993). BVAR models address the proliferation of parameters by applying informative priors, which shrink the coefficients of longer lags and less influential variables toward zero. This reduces estimation uncertainty and improves forecast accuracy without explicitly excluding variables or lags, thereby reducing overfitting while maintaining the model's structure. If certain lagged effects are indeed significant, the data can override the prior assumptions, preserving the flexibility of the model. This Bayesian approach improves the efficiency of parameter estimation and forecast accuracy.

5.2 | Bayesian VAR

We estimate a BVAR for the period that precedes the Iberian Exception and for which data is available (from January 2010 to June 2022).[7] We apply the Conjugate Minnesota prior, imposing a multivariate normal distribution on the regression coefficients, and an Inverse-Wishart distribution on the error covariance matrix.

The standard deviation of the prior for lag m of variable j in equation i is defined as:

$$S(i, j, m) = \left[w \times g(m) \times f(i, j)\right] \times \left(\sigma_i / \sigma_j\right) \tag{2}$$

where w represents the overall tightness, $g(m) = m^{-d}$ follows a harmonic shape with a decay factor $d > 0$, and $f(i, j)$ adjusts for tightness between variables i and j in equation i. We will have $f(i, j) = 1$ if $i = j$ and k otherwise $(0 \leq k \leq 1)$. σ_i represents the standard error of a univariate autoregression for variable i and σ_i / σ_j adjusts for differences in the units of measurement between variables, allowing the prior to be specified independently of the variables' magnitudes.

The posterior distribution is simulated using Gibbs sampling, with 12,500 Markov Chain Monte Carlo (MCMC) iterations (including a 2500 iteration burn-in). The resulting Markov chains exhibit high efficiency, with effective sample sizes close to the total number of retained draws, indicating low autocorrelation and good mixing. This framework, following the mixed estimation logic of Theil (1971), effectively addresses overparameterization while incorporating prior information into the estimation process.

5.3 | Bayesian Dynamic Forecast

Our primary objective is to produce a forecast of energy inflation under a no-policy environment, conditional on the historical dynamic relationships present in the pre-policy data. While reduced-form BVAR models do not explicitly identify structural shocks, they are widely accepted for policy evaluation and forecasting exercises. This way, after fitting the BVAR, we perform a Bayesian Dynamic Forecast proposed by Karlsson (2013), from July 2022 until December 2023 (the period during which the Iberian Exception was in place). The analysis does not aim to isolate structural shocks but instead relies on historical dynamics to characterize how energy inflation would have evolved in the absence of the Iberian Exception. The estimated policy effect is defined as the difference between observed energy inflation and the posterior predictive mean of the no-policy forecast, while uncertainty is assessed using the distribution of simulated counterfactual paths. The forecast is derived from the posterior predictive distribution, which accounts for parameter uncertainty, and is formalized as:

$$p\left(Y_{T+1:T+h} | \, Y_{1:T}\right) = \int f\left(Y_{T+1:T+h} | \, Y_{1:T}, \theta\right) p(\theta | \, D) d\theta \tag{3}$$

where θ is the model parameter vector which includes the coefficient matrices $A_1, \ \dots, A_p$, the intercept vector c, and the error covariance matrix of the error terms. $p(\theta | \, D)$ stands for the posterior distribution of the model parameters given some data D, and the model's forecast function is given by $f\left(Y_{T+1:T+h} | \, Y_{1:T}, \theta\right)$. For each θ^s from the $\left\{\theta^1, \ \dots, \theta^M\right\}$ MCMC sample, the method sequentially generates $\widetilde{Y}_{T+1}$ from $f\left(Y_{T+1} | \, Y_{1:T}, \theta^s\right)$, up to $\widetilde{Y}_{T+h}$ from $f\left(Y_{T+h} | \widetilde{Y}_{1:T}, \widetilde{Y}_{T+1:T+h-1} \ \theta^s\right)$.

5.4 | Variables and Data

The model's endogenous variables are: energy inflation, defined as the monthly year-on-year percentage change in the energy component of the Harmonized Index of Consumer Prices (HICP) from Eurostat; the price of electricity in Portugal from the Nominated Electricity Market Operator[8]; the 3-month Euribor rate, from Eurostat to capture the monetary policy stance; the nominal effective exchange rate of the eurozone against the EER-18[9] group, a good indicator of external inflationary pressures, from BPstat; the price of oil and natural gas (in euros) from BPstat and FRED, respectively, since fluctuations in raw material prices significantly impact inflation rates (Choi et al. 2018).

To account for other domestic measures implemented during the policy period that may have influenced energy inflation, we also consider relevant exogenous control variables: a regime dummy reflecting the extraordinary and discretionary reductions in the ISP; a time-varying effective VAT rate reflecting the introduction of reduced VAT rates for specific consumption thresholds; and a dummy variable that captures the pause in automatic carbon tax updates. Table 1 shows the descriptive statistics of the variables.

5.5 | Stationarity

There is no consensus in the literature on whether BVAR models should be specified in levels or differences. Some researchers argue that the use of levels allows the incorporation of long-term relationships, provided that the appropriate priors account for unit roots (Bańbura et al. 2023; Giannone et al. 2012). However, others highlight the advantages of differencing. Clements and Hendry (1996) show that differencing improves forecast accuracy in the presence of structural instability, while Diebold and Kilian (2000) demonstrate that, for variables with unit roots, forecasts tend to be more precise when differences are used. Furthermore, the BVAR literature suggests that models in levels may underperform if priors do not explicitly account for unit roots and cointegration (Bańbura et al. 2023; Giannone et al. 2014, 2012). Several studies following the Minnesota prior tradition recommend differencing to enhance predictive performance (Carriero et al. 2013; Clark and McCracken 2008; Del Negro and Schorfheide 2004; Koop 2011).

Given this debate, we adopt a specification in differences for the endogenous variables. This also allows us to ensure parameter stability which is not verified when using variables in levels. To verify the presence of unit roots, we conduct Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests: first differences were applied to energy inflation, the nominal effective exchange rate, and electricity prices under the Iberian Exception, while the Eurozone's short-term interest rate was differenced twice. Oil and natural gas prices were log-transformed before differencing.

TABLE 1 | Descriptive statistics.

Variables	Obs.	Mean	SD	Min.	Max.
Energy inflation	168	3.49	9.04	−18.80	31.90
Price of a barrel of oil	168	65.01	19.54	13.90	120.49
Price of natural gas	168	9.28	9.20	1.34	69.09
Exchange rate	168	99.16	3.73	89.97	110.91
Short-term (3-month) interest rate	168	0.34	1.06	−0.58	3.97
Price of electricity	168	64.89	50.67	15.39	310.46
ISP reduction dummy	168	0.13	0.33	0	1
Effective VAT rate	168	0.23	0.01	0.21	0.23
Carbon tax freeze dummy	168	0.10	0.29	0	1

6 | Estimating the BVAR for the Pre-Policy Period

Before estimating the BVAR, we must select the appropriate lag length which is crucial for VAR models. Traditional methods, such as the AIC criterion, tend to overestimate the number of lags. In contrast, Bayesian analysis calculates the posterior probability of each model based on the observed data. To calculate these posterior probabilities, we estimate several models that differ from each other in the number of lags considered. The chosen one, that is, the one with the highest posterior probability is the one with two lags.

6.1 | Analysis of Convergence and Posterior Distributions in MCMC

To evaluate the performance of the MCMC and ensure reliable estimates of the effect of other variables on energy inflation, we will use three graphical tools. First, we examine trace plots to assess the mixing and stability of the chains. Next, we analyze autocorrelation plots to evaluate the independence of the samples. Lastly, we use histograms and kernel density plots to visualize the marginal distributions and compare them with the prior distributions. These graphs can be found in the Appendix A (Figures A1–A12).

The trace plots reveal that the MCMC chain is mixing well and has likely converged to the true posterior distribution, as the values move quickly across their range, creating dense, almost vertical lines and indicating efficient exploration of the parameter space without noticeable trends. Furthermore, we observe low autocorrelation across lags, and the coefficient distributions align closely with the normal distribution, as expected. The kernel density plots further confirm the convergence as the three density curves (representing the overall MCMC sample, the first half, and the second half) are nearly identical. This consistency suggests that the chain has effectively explored the parameter space and convergence problems are unlikely to exist.

6.2 | Parameter Stability

In the Bayesian framework, ensuring that the estimated system remains stable (i.e., with eigenvalues inside the unit circle) is important for the validity of dynamic forecasts. Although parameter constancy is less of a rigid assumption than in frequentist models, instability can still lead to poor predictive performance and misleading inferences. Our posterior stability diagnostics confirm the appropriateness of the estimated BVAR.

7 | Empirical Results and Discussion

The prediction performed assumes that the dynamics of energy inflation and its determinants, would have followed their historical patterns from the pre-policy period. This implies that deviations between the observed and predicted inflation during the policy period can thus be interpreted as the effect of the policy. Our findings indicate that the Iberian Exception resulted in an average reduction of 3.14 p.p. in energy inflation between June 2022 and December 2023. Figures 3 and 4 illustrate that, for most of this period, and according to the model's forecasts, energy inflation would have been higher without the policy.

A closer look at subperiods facilitates a comparison with the existing literature. Thus, we begin by analyzing the period up to June 2023, as examined by Ruiz et al. (2024), for which our estimates suggest that this unconventional fiscal policy contributed to a 6.99 p.p. reduction in Portuguese energy inflation. This effect is similar to the approximately 6 p.p. decrease reported by Ruiz et al. (2024), reinforcing the robustness and consistency of

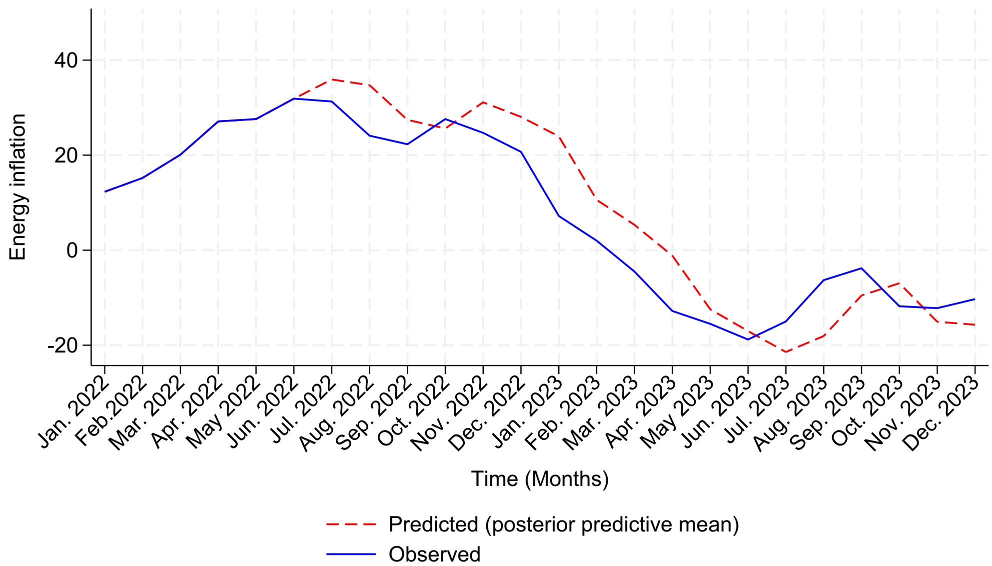

FIGURE 3 | Predicted versus observed energy inflation. The figure compares observed energy inflation with a predicted path estimated for July 2022–December 2023.

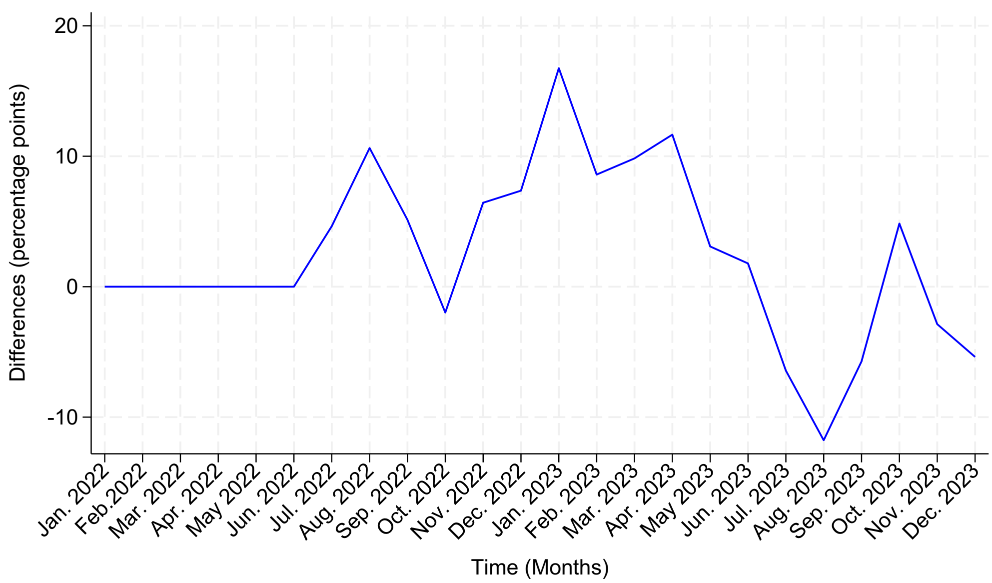

FIGURE 4 | Differences between the predicted and observed energy inflation. The series summarizes the estimated impact of the policy intervention, with deviations from zero after July 2022 reflecting the predicted effect of the mechanism.

both studies. Thus, our findings also demonstrate that the results of the BVAR approach align with those obtained using the synthetic control method, without the need to construct a control based on data from other countries.

Upon further breakdown, we find that until December 2022, the Iberian Exception had a more modest effect, reducing energy inflation by 5.37 p.p. However, its impact intensified in the first half of 2023, peaking at a reduction of energy inflation of about 8.62 p.p. The delayed and nonlinear impact of the Iberian Exception reflects important features of the electricity market transmission. First, there may have been initial resistance in cost pass-through, muting the policy's early effects: firms might have been hesitant to lower prices due to strategic pricing considerations and uncertainty about market stability. These frictions are consistent with economic research by Borenstein et al. (1997) that suggests that firms often adjust prices asymmetrically, passing on cost increases more quickly than reductions. This pricing asymmetry could help explain why the Iberian Exception took time to achieve its full impact. Over time, as the policy mechanism became more fully integrated into the dynamics of energy pricing, its influence grew.

Second, the use of futures markets and fixed-price contracts, common in the region, can create delays in the pass-through of market price changes to consumers. Futures markets allow energy producers and consumers to lock in prices for future delivery, providing stability but also dampening the immediate pass-through of fluctuations in wholesale prices. Similarly, fixed-price contracts offer price certainty but prevent consumers from benefiting from immediate reductions in spot prices. As a result, even if the price cap reduces wholesale prices, the full impact may not be reflected in consumer bills until these contracts expire or are renegotiated. This delay underlines the complexity of the pass-through process and highlights the importance of market structures in determining the speed and effectiveness of policy interventions.

In contrast, during the second half of 2023, the estimated difference between predicted and actual energy inflation became negative (−4.56 p.p.). This suggests that, according to our model, the expected energy inflation without the Iberian Exception would have been lower than the actual inflation observed under the mechanism. One possible explanation for this reversal is the influence of external market factors, such as declining global energy prices or supply-side adjustments, which may have contributed to lower inflation even in the absence of the policy. In addition, other macroeconomic developments, such as changes in fiscal or monetary policy, could have altered the expected trajectory of energy prices.

Overall, our results indicate that the Iberian Exception had a significant but time-sensitive effect on Portuguese energy inflation. The impact of the policy was most pronounced in the first half of 2023, demonstrating its effectiveness in the short to medium term. However, its diminishing influence in the latter half of the year underscores the need for complementary policies or structural adjustments to maintain long-term energy price stability. Further research is necessary to disentangle the role of exogenous market factors from the policy's direct effects, particularly during the final months of its implementation.

7.1 | Robustness of Forecast

As a robustness check, we conduct three complementary robustness exercises. First, we evaluate within-sample forecast performance to assess model calibration. Second, we implement a placebo forecast over a pre-policy period with no intervention to test whether the methodology mechanically generates spurious effects. Third, we perform a structured sensitivity analysis with respect to both lag length and prior specification in the BVAR. Results are detailed in Appendix B.

The evidence obtained consistently supports the robustness of the main findings. The within-sample forecasts closely track pre-policy energy inflation with no evidence of systematic bias, the placebo exercise yields effects centered around zero and clearly distinct from those observed during the policy period, and the sensitivity analysis shows that the predicted impact remains stable across reasonable alternative specifications. These results reinforce the credibility of the estimated effects of the Iberian Exception.

7.2 | Cost-Effectiveness of the Iberian Exception

The fiscal cost of the Iberian Exception arises from the compensation paid to gas-fired generators for the difference between the market price of natural gas and the capped reference price. While a full cost–benefit assessment lies beyond the scope of this paper, available public information provides guidance on its order of magnitude. Official settlement reports from the Iberian market operator and national regulators indicate that cumulative compensation payments in Portugal represented a relatively modest share of domestic electricity expenditure, partly reflecting Portugal's lower reliance on gas-fired generation compared with Spain. At the same time, the mechanism substantially reduced wholesale electricity prices, limiting the pass-through to retail energy inflation and generating sizeable savings for spot-market consumers.

However, a precise quantification of the net fiscal impact for Portugal is constrained by data limitations. Compensation payments were distributed across Spain and Portugal, and a significant fraction of Portuguese consumers remained on fixed-price contracts, weakening the direct link between wholesale price reductions and realized consumer gains. Consequently, while the price-stabilization effects of the mechanism are clear and measurable in wholesale and retail price data, any assessment of overall cost-effectiveness must remain cautious in the absence of more granular data on consumption, contract structures, and compensation flows.

7.3 | Estimation Uncertainty and Posterior Inference

Assessing policy effects solely through point estimates may obscure the uncertainty surrounding the predicted no-policy trajectory. In a Bayesian framework, this uncertainty reflects both parameter uncertainty and the propagation of historical shocks through the system. To characterize this uncertainty, we rely on simulations from the posterior distribution that condition on zero future policy shocks, thereby isolating uncertainty arising from parameter estimation and the observed state of the economy. Posterior credible intervals around the resulting path therefore provide a direct measure of conditional uncertainty.

Figure 5 displays the simulated counterfactual path of energy inflation together with 68% and 90% posterior credible intervals. Figure 6 reports the corresponding posterior distribution of simulated counterfactual-observed differences, allowing for a month-by-month characterization of the magnitude of the estimated policy effect and its associated uncertainty.

The posterior credible intervals are relatively narrow over most of the sample, indicating that the data are informative about the simulated counterfactual outcomes and the implied differences relative to observed energy inflation. The simulated path implies a sustained gap relative to the observed series during the core phase of the policy, consistent with the dynamic patterns documented above. Beyond the dynamic analysis, we summarize posterior uncertainty around average policy effects over the full treatment period and selected subperiods. For each MCMC draw, we compute the average difference between the simulated counterfactual and the observed inflation series over the period of interest. This yields a posterior distribution of average effects, from which the posterior mean, posterior

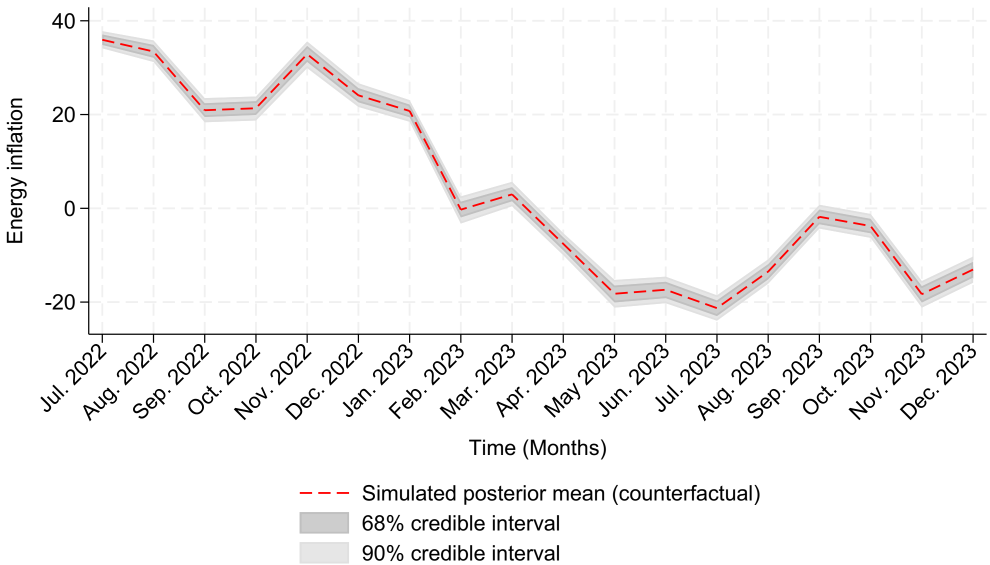

FIGURE 5 | Simulated counterfactual path of energy inflation with posterior credible intervals. The dashed line represents the simulated posterior mean, while the shaded areas denote the 68% and 90% posterior credible intervals capturing uncertainty around the counterfactual path.

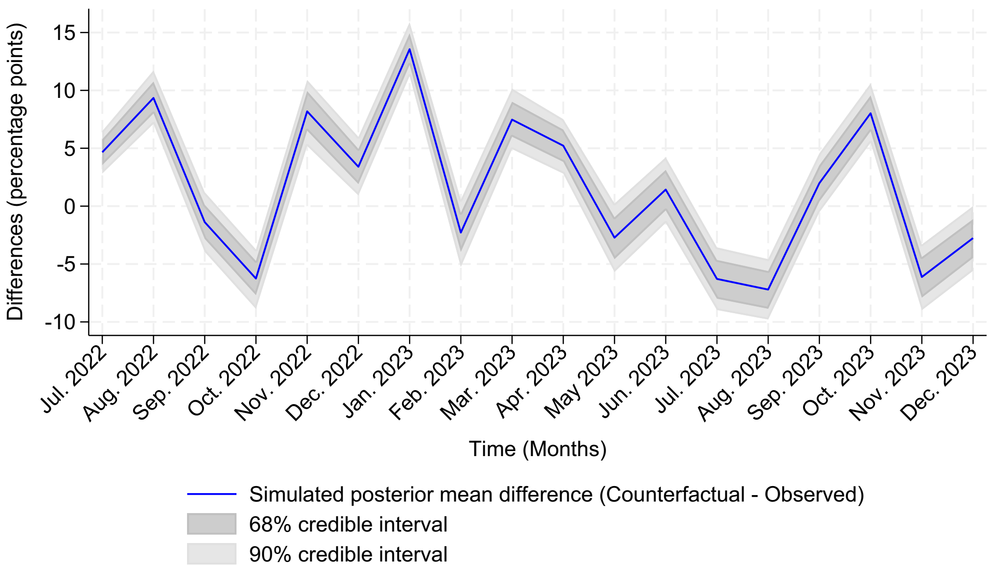

FIGURE 6 | Simulated counterfactual-observed differences in energy inflation with posterior credible intervals. The solid line represents the simulated posterior mean difference, while the shaded areas denote the 68% and 90% posterior credible intervals capturing uncertainty around the counterfactual path.

TABLE 2 | Posterior distribution of average policy effects.

Period	Mean	Median	68% CI	90% CI
Policy period (Jul 2022–Dec 2023)	1.57	1.58	[0.33, 2.81]	[−0.49, 3.64]
Jul 2022–Jun 2023	3.39	3.38	[2.20, 4.57]	[1.35, 5.39]
Jul 2022–Dec 2022	3.00	3.01	[1.89, 4.09]	[1.12, 4.83]
Jan 2023–Jun 2023	3.78	3.77	[2.39, 5.15]	[1.48, 6.09]
Jul 2023–Dec 2023	−2.06	−2.05	[−3.66, −0.51]	[−4.61, 0.49]

median, and the 68% and 90% credible intervals are reported in Table 2.

Average effects are positive and economically meaningful over the main phase of the policy, particularly between mid-2022 and mid-2023, with posterior distributions centered around three percentage points. When averaging over longer horizons, including the full policy period, the estimated average effects are smaller, reflecting the inclusion of later months in which the impact of the mechanism weakens.

Overall, this exercise complements the dynamic analysis by summarizing how posterior uncertainty around the estimated policy effect evolves across time windows. Importantly, the posterior distributions of average effects are consistent with the qualitative patterns observed in the simulated counterfactual analysis, supporting the robustness of the main conclusions regarding the role of the Iberian Exception during its core implementation phase.

8 | Conclusion

Faced with rising prices in 2022, Portugal and other countries in the Eurozone implemented a series of measures, commonly referred to as unconventional fiscal policies, aimed at reducing the effects of inflation, particularly in the energy sector, on companies' production costs and household income, complementing the effect of restrictive monetary policies. Among them, the Iberian Exception was designed to limit the impact of natural gas prices on electricity prices within the Iberian market (MIBEL).

Although several additional measures were implemented during the same period to mitigate the broader impact of rising living costs, these interventions largely operated on the demand side of the economy and are not expected to directly affect the wholesale electricity price formation mechanism analyzed in this paper. Income-support schemes, expanded social tariffs, and targeted transfers were primarily designed to sustain household purchasing power rather than to influence the marginal cost of electricity generation. Any effect on measured energy inflation is therefore likely to be indirect and diffuse, working through aggregate demand rather than through the pricing rules of the electricity market. Accordingly, our analysis focuses on policy instruments with a clear and immediate impact on electricity prices.

This study estimates a BVAR model to forecast energy inflation under the aegis of the Iberian Exception, including data on monetary policy intervention to control for its role in lowering overall inflation. The findings indicate that the implementation of a natural gas price cap in the Iberian market had the desired impact on energy inflation, resulting in a total decrease of 3.14 p.p. in Portugal during the entire policy lifetime. However, this impact did not follow a linear path. Thus, in the beginning, the policy led to a modest reduction of inflation of about 5.37 p.p., followed by a more accentuated decrease of 8.62 p.p. in the first semester of 2023, and then reverted to a negative impact of −4.56 p.p. in the last semester of 2023. This behavior may reflect both the fact that firms tend to adjust prices asymmetrically, passing on cost increases more quickly than reductions, and the adjustment in market conditions, especially given the use of futures markets and fixed-price contracts within MIBEL.

From a public policy perspective, our results indicate that, by offering targeted relief to consumers and businesses, an unconventional fiscal policy such as the Iberian mechanism can serve both as a useful tool to mitigate the impact of energy price shocks and to complement the role of restrictive monetary policies. In other words, the results suggest that unconventional fiscal policies can be effective in tackling supply-driven inflation, for which monetary policy alone is insufficient, given its intervention on the demand side.

This analysis' main limitation is the use of monthly data which implies that the initial 15 days of the policy were considered part of the preintervention period, which may slightly affect the estimated impact, a consequence of data availability. Besides, our approach is reduced-form and focuses on estimating the aggregate impact of the Iberian Exception on energy inflation. It does not identify the underlying structural transmission channels; however, we believe this limitation does not undermine the credibility of the results, given the objectives of the analysis.

Future research could usefully complement our short-run empirical analysis with a structural equilibrium perspective aimed at assessing the medium- to long-run implications of the Iberian Exception. A general equilibrium framework would be particularly well suited to studying longer-term adjustments in energy demand, generation capacity, investment decisions, and distributional outcomes across households and firms. While such an approach necessarily relies on additional structural assumptions and lies beyond the scope of the present paper, our results provide an empirically grounded benchmark that could inform the calibration and interpretation of future structural analyses.

Future research could examine the overall cost-effectiveness of the Iberian Exception once more granular data become available, on compensation payments, their allocation across countries, and consumer exposure through contract types. While our analysis clearly documents the mechanism's price-stabilization effects, a full fiscal assessment remains an open question for future work.

Author Contributions

Luís Clemente-Casinhas: writing – review and editing, software, methodology, writing – original draft, validation. **Sofia Vale:** project administration, conceptualization, writing – original draft, writing – review and editing, validation. **Lourenço Cerdeira:** conceptualization, data curation, writing – original draft, writing – review and editing, validation, software.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1] For more details, see, for example, Enerdata.

[2] For instance, according to Bruegel's dataset on national fiscal policy responses to the energy crisis, since September 2021, European countries have allocated substantial funds to mitigate rising energy costs, totaling €540 billion in the EU, €103 billion in the UK, and €8.1 billion in Norway. Germany alone earmarked €158 billion.

[3] From 2020 onward, other factors also contributed to the inflationary surge: the base effects of low prices in 2020 due to the COVID-19 pandemic, leading to a mechanical increase in inflation in 2021 (Sloover et al. 2022); the economic reopening, combined with expansionary fiscal and monetary policies, fueling demand while supply chain disruptions constrained production (Bańbura et al. 2023); rising wages, increased profit margins, the depreciation of the euro, and food price increases driven by supply shocks and adverse weather conditions (BdP 2023; ECB 2023).

[4] International Energy Association.

[5] *Direção-Geral de Energia e Geologia* (Directorate-General for Energy and Geology).

[6] The adjustment of electricity production costs for thermoelectric power plants and cogeneration facilities is given by $\left(P_{GN} - P_{RGN}\right) / 0.55$ where P_{GN} is the price of natural gas and P_{RGN} is the reference price, in €/MWh.

[7] The Iberian mechanism came into force on 15 June 2022, but since we are working with monthly data, it is assumed that the policy was implemented in July 2022.

[8] OMIE (Nominated Electricity Market Operator, NEMO).

[9] 18 trading partners: Australia, Canada, Denmark, Hong Kong, Japan, Norway, Singapore, South Korea, Sweden, the United Kingdom, Switzerland, the United States, Bulgaria, China, the Czech Republic, Hungary, Poland, and Romania.

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Appendix A

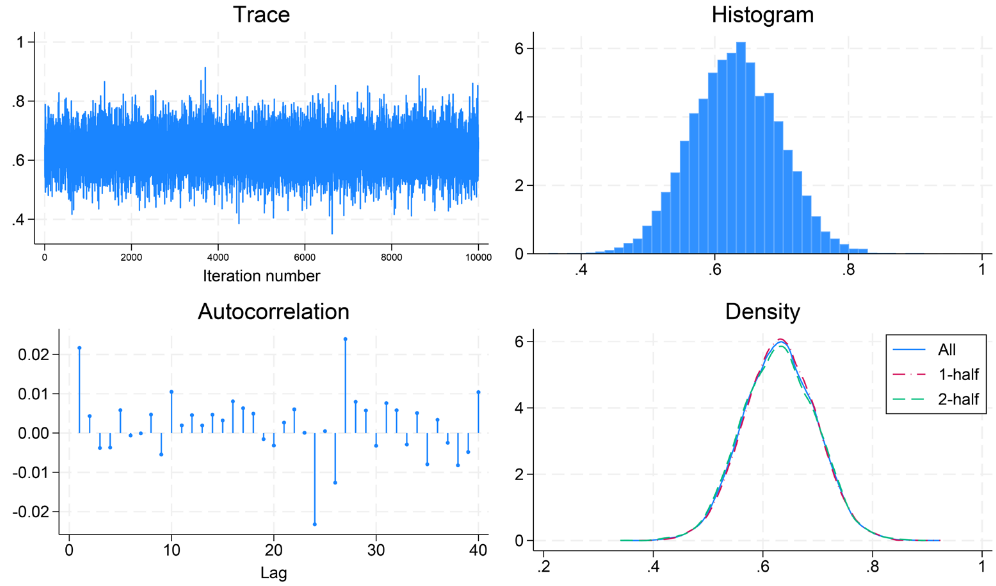

FIGURE A1 | Convergence and Posterior Distributions in MCMC—Energy inflation (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

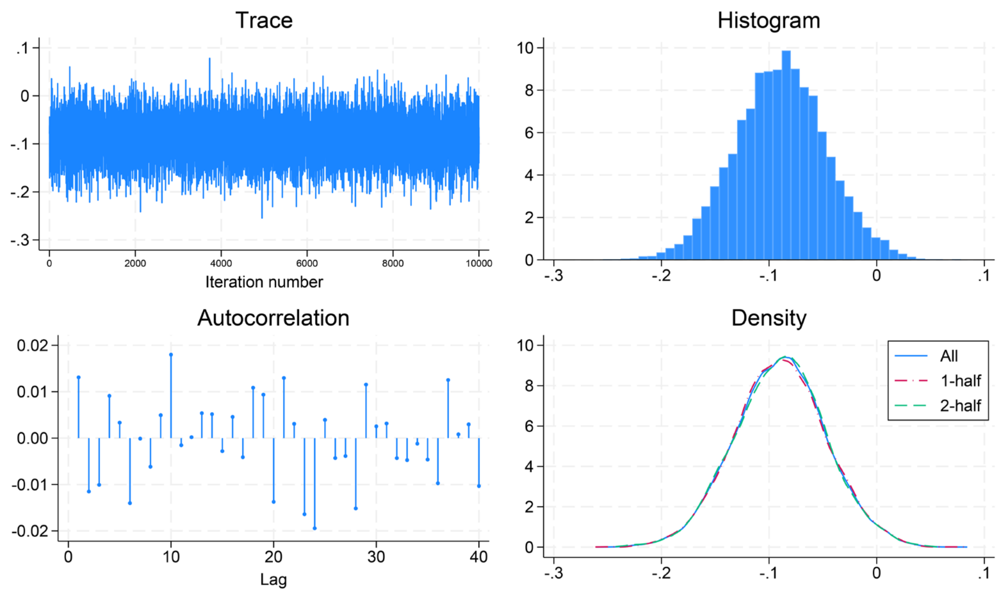

FIGURE A2 | Convergence and Posterior Distributions in MCMC—Energy inflation (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

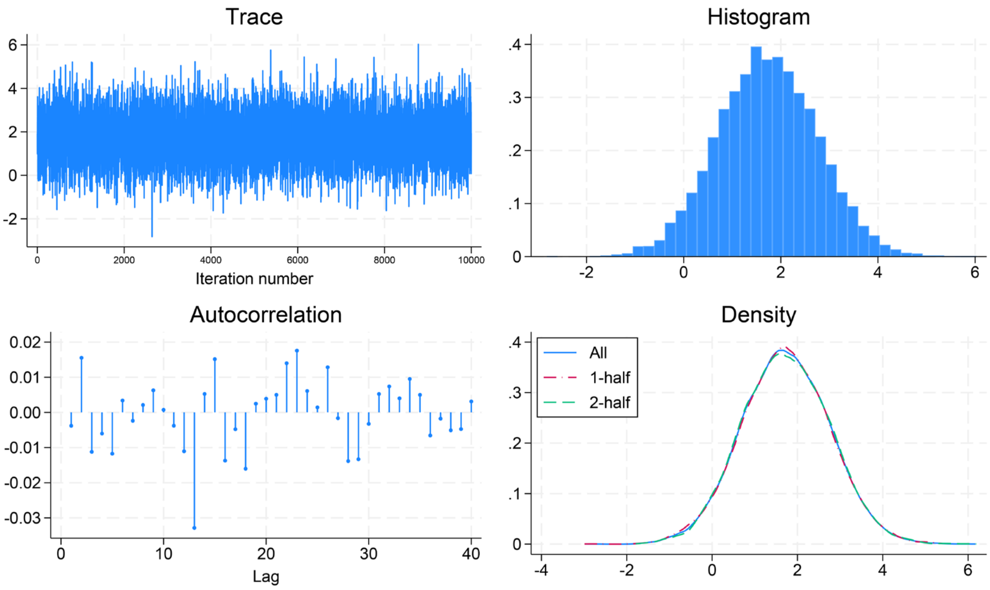

FIGURE A3 | Convergence and Posterior Distributions in MCMC—Price of a barrel of oil (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

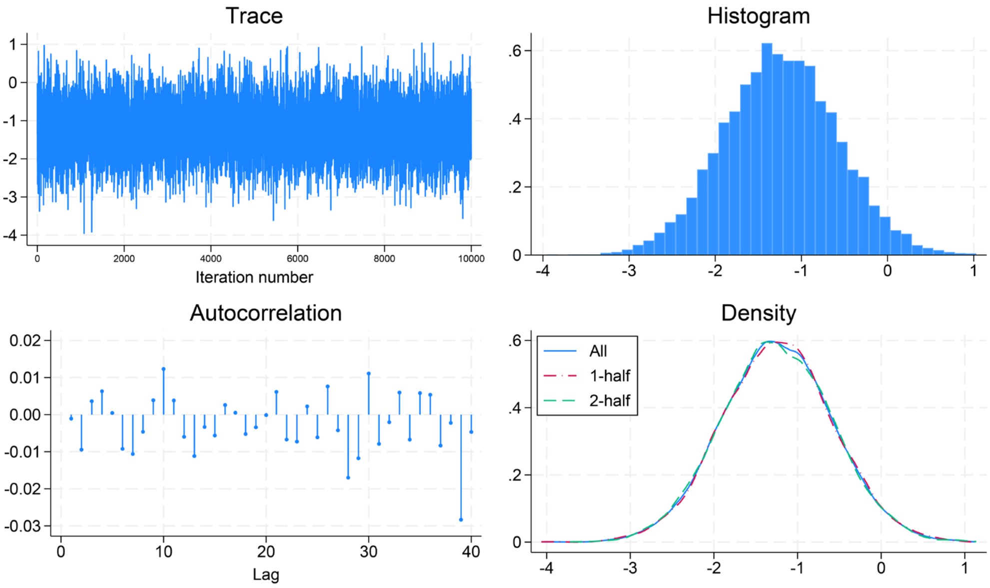

FIGURE A4 | Convergence and Posterior Distributions in MCMC—Price of a barrel of oil (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

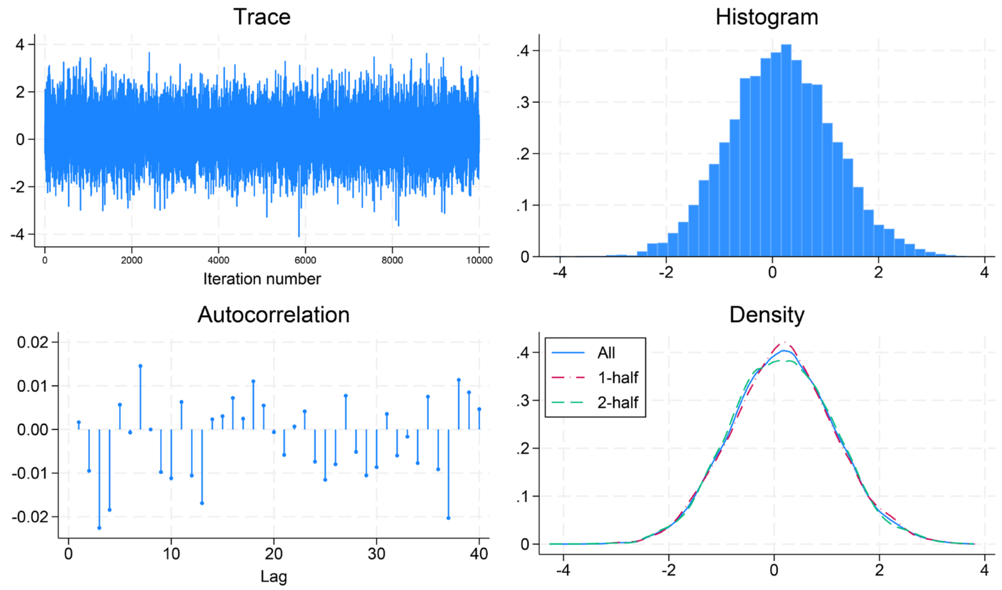

FIGURE A5 | Convergence and Posterior Distributions in MCMC—Price of natural gas (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

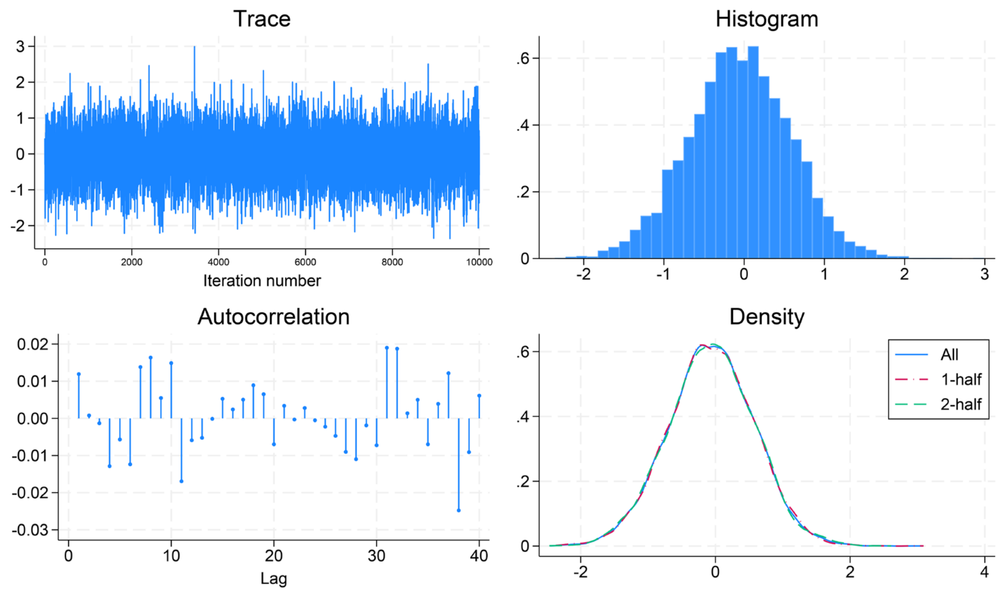

FIGURE A6 | Convergence and Posterior Distributions in MCMC—Price of natural gas (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

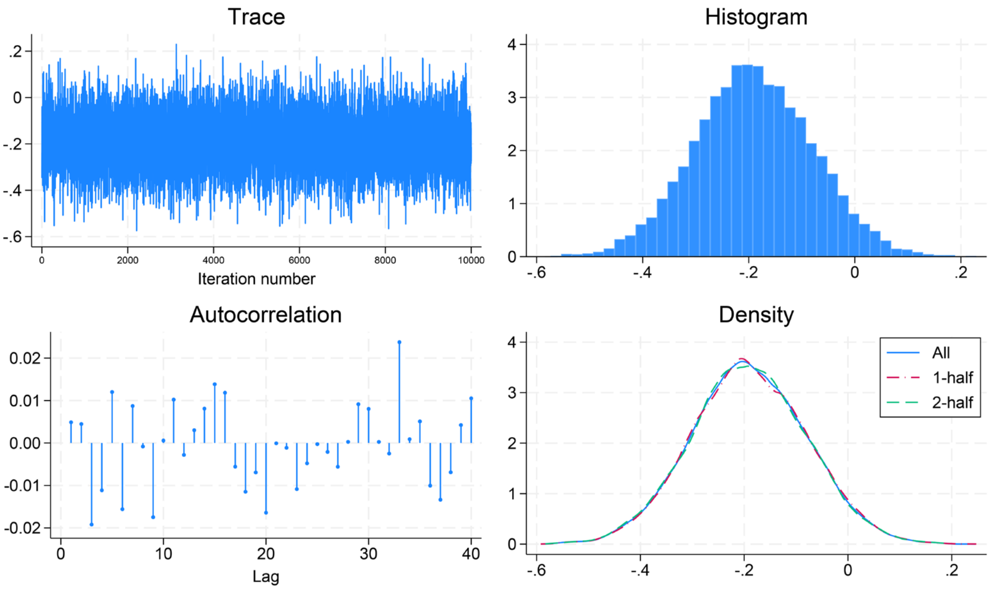

FIGURE A7 | Convergence and Posterior Distributions in MCMC—Exchange rate (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

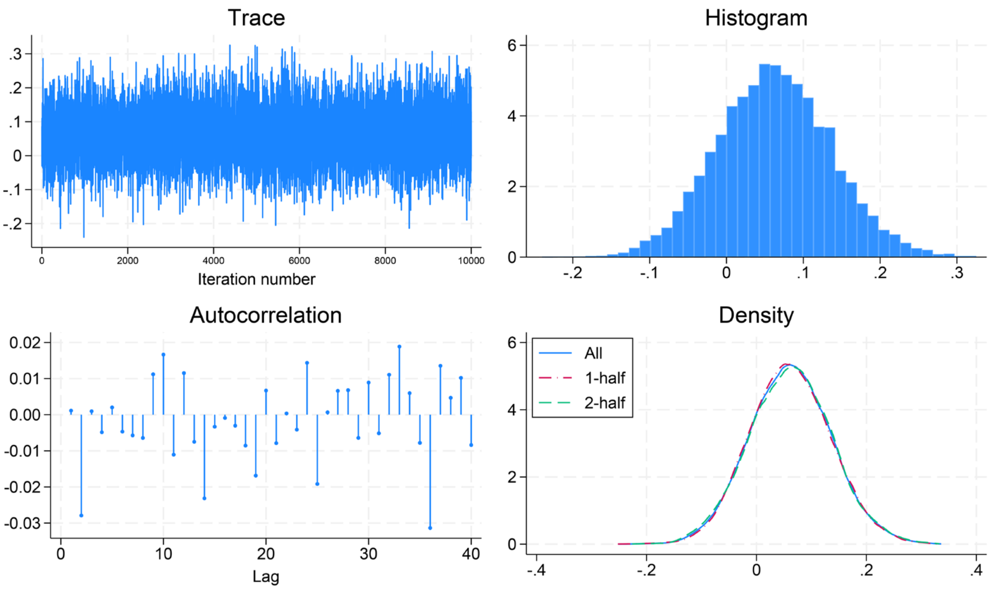

FIGURE A8 | Convergence and Posterior Distributions in MCMC—Exchange rate (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

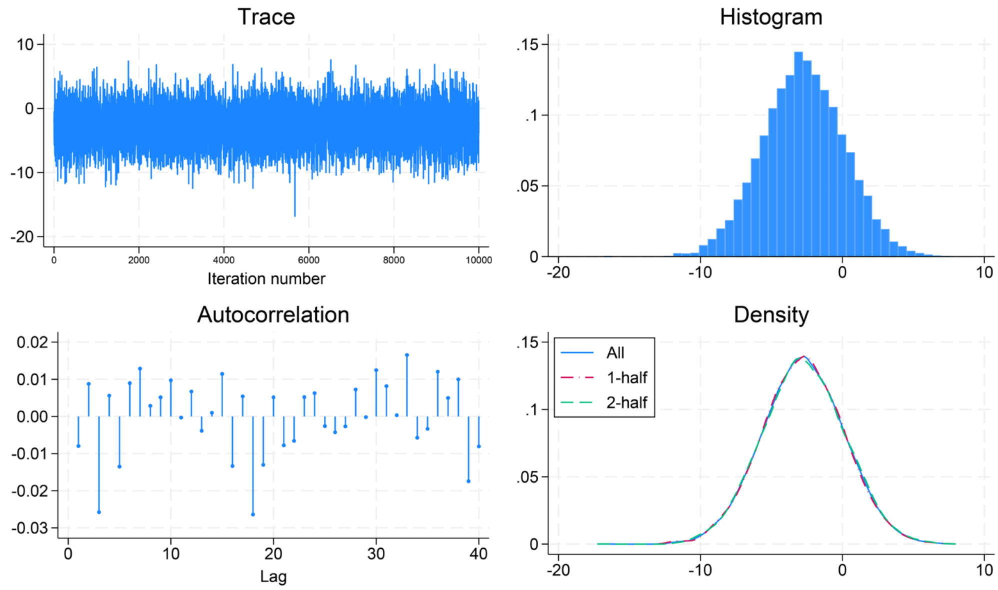

FIGURE A9 | Convergence and Posterior Distributions in MCMC—3-month interest rate (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

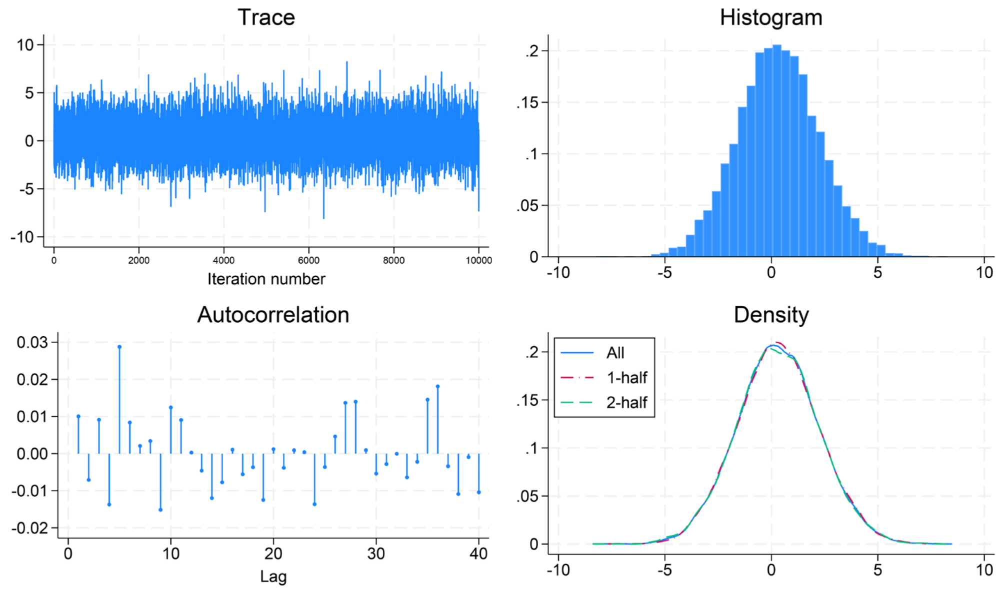

FIGURE A10 | Convergence and Posterior Distributions in MCMC—3-month interest rate (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

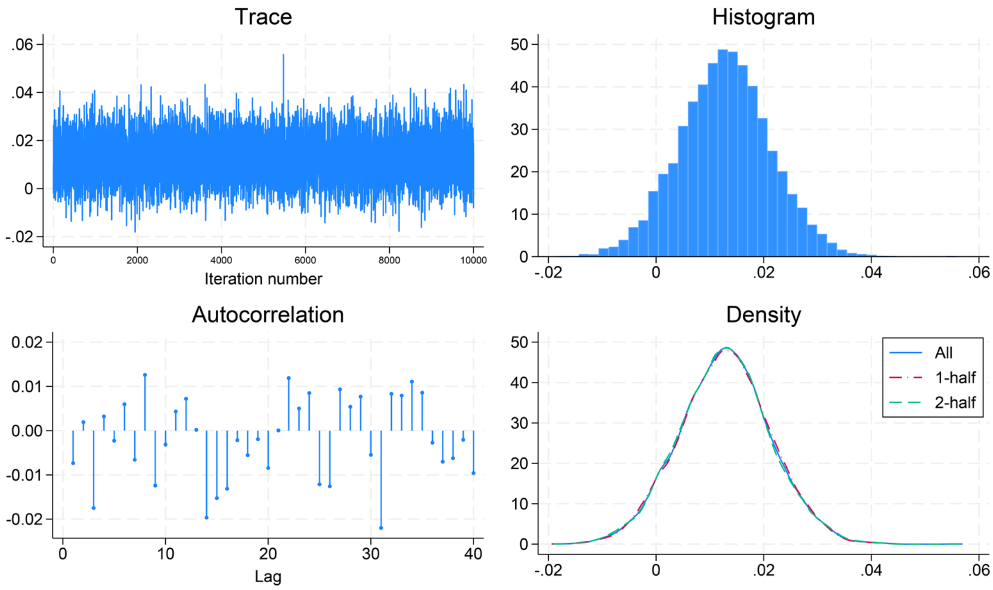

FIGURE A11 | Convergence and Posterior Distributions in MCMC—Price of electricity (first lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

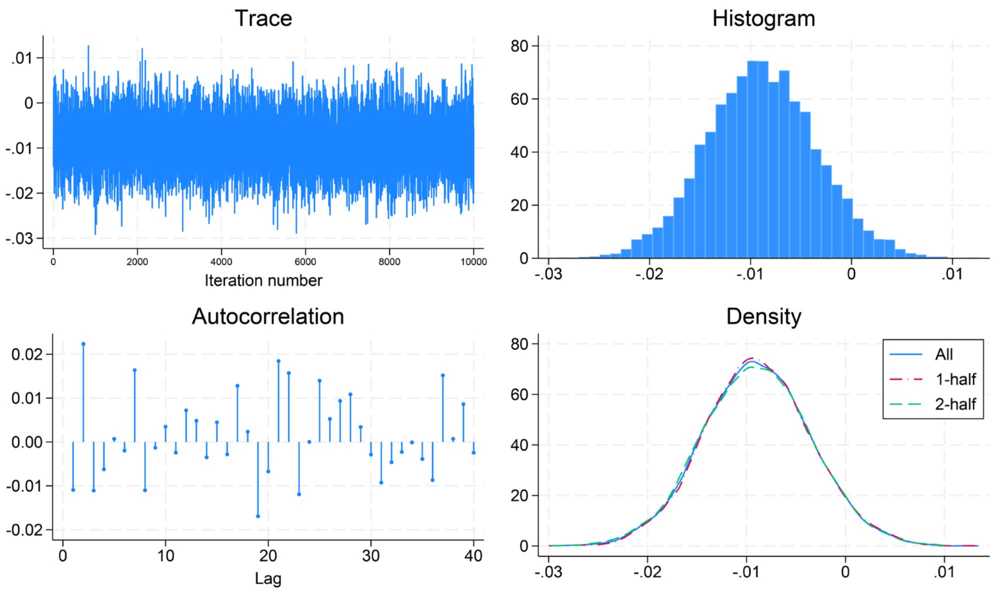

FIGURE A12 | Convergence and Posterior Distributions in MCMC—Price of electricity (second lag). Trace plots check mixing and stability, while autocorrelation plots assess sample independence. Histograms and kernel density plots visualize marginal distributions and compare the full sample with its halves to confirm convergence.

Appendix B

Robustness of Forecast

Within-Sample Forecast Evaluation

As a diagnostic check of model calibration, we assess whether the estimated BVAR reproduces the historical dynamics of energy inflation in the pre-policy sample. Specifically, we examine within-sample forecasts constructed using only the information available at each point in the estimation period. This approach allows us to evaluate the model's ability to track observed inflation dynamics without relying on the forward-looking assumptions.

The results indicate that the BVAR closely follows pre-policy inflation trends, with an average within-sample forecast error of 0.001. A formal test does not reject the null hypothesis of zero mean forecast error ($p=0.99$). This shows there is no evidence of systematic forecast bias. Overall, these findings indicate that the model is well calibrated during the estimation period.

Placebo Forecast

To assess whether the estimated policy effects could arise from generic forecasting dynamics rather than from the policy intervention itself, we conduct a placebo forecast exercise over a period without policy intervention. The objective is to verify that the BVAR does not mechanically generate systematic deviations between observed outcomes and model-based predictions in the absence of treatment. The placebo analysis is implemented using an 18-month window drawn from the pre-2021 sample.

The resulting placebo effects are centered close to zero. In particular, the median placebo effect is −0.23 percentage points and the mean placebo effect is −0.25 percentage points, indicating the absence of systematic bias in the placebo distribution. The difference between the mean and the median reflects the presence of a small number of extreme realizations.

By contrast, applying the same methodology to the actual policy window yields a clearly positive and economically meaningful distribution of effects, with a mean of 3.14 percentage points and a median of 4.74 percentage points. This contrast indicates that the estimated policy effects are not driven by mechanical features of the forecasting framework but are specific to the period in which the Iberian Exception was in place.

TABLE B1 | Sensitivity to lag length.

Lag length	Predicted effect
1 lag	1.27
2 lags (baseline)	3.14
3 lags	3.18
4 lags	3.19
5 lags	3.45

TABLE B2 | Sensitivity to prior specification.

Prior specification	Predicted effect
Default conjugate Minnesota prior (baseline)	3.14
Original Minnesota prior with fixed error covariance	2.11
Minnesota prior with inverse-Wishart covariance prior	2.57
Minnesota prior with Jeffreys covariance prior	2.56

Sensitivity to Prior Specification and Lag Length

Because BVAR estimates may depend on the choice of prior and lag length, we conduct a structured sensitivity analysis to verify that our results are not driven by modeling assumptions. The goal is to assess whether reasonable variations in these dimensions materially affect the estimated impact of the Iberian Exception.

Sensitivity to Lag Length

In Bayesian VARs with shrinkage, lag length should be determined empirically rather than imposed mechanically based on data frequency. In the baseline specification, a two-lag structure is adopted. To assess the sensitivity of the results to this choice, we re-estimate the model using alternative lag lengths ranging from one to five lags under the default conjugate Minnesota prior.

Table B1 reports the predicted effects for alternative lag choices. For specifications with three to five lags, the estimated effects are highly stable, ranging between 3.18 and 3.45, compared with a baseline value of 3.14 (2 lags). By contrast, the one-lag specification yields a substantially smaller estimate, suggesting that an overly restrictive dynamic structure fails to capture the full adjustment dynamics.

Overall, the results indicate that the estimated effect is robust to reasonable variations in lag length, provided that sufficient dynamics are allowed in the model. Moreover, the baseline two-lag specification is selected as the preferred model based on posterior model probabilities, implying that the divergence observed under a one-lag specification does not undermine the main conclusions.

Sensitivity to Prior Specification

We also assess robustness with respect to alternative Minnesota-prior formulations. These priors share the same shrinkage structure for the VAR coefficients but differ in how they treat the error covariance matrix. In addition to the default conjugate Minnesota prior, we estimate the model using: the original Minnesota prior with fixed error covariance; a Minnesota prior combined with an inverse-Wishart prior for the error covariance; and a Minnesota prior combined with a multivariate Jeffreys prior for the error covariance. We note, however, that modifying the prior may alter the posterior probability assigned to competing model specifications, including the lag structure. Failing to account for this may confound prior sensitivity with model misspecification, as changes in the results could reflect an inappropriate lag length under the new prior rather than genuine dependence on prior assumptions. Accordingly, as in the estimation of the benchmark model, for each alternative prior we select the lag length that maximizes the posterior model probability and re-estimate the BVAR using this prior-specific specification.

Table B2 reports the resulting effects. While point estimates vary across priors, they remain of the same order of magnitude and close to the baseline value of 3.14.

This consistency indicates that the estimated effect of the Iberian Exception is robust to alternative prior formulations and that the main conclusions are not driven by a particular treatment of the error covariance matrix.