



Unconventional Monetary Policies in Emerging Markets: Turkey's Experience Through the Lens of Synthetic Control

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Abstract

This study investigates the impact of the Central Bank of Turkey's (CBRT) unconventional monetary policy shift in 2021 particularly aggressive interest rate cuts on inflation and macroeconomic stability by applying the Synthetic Control Method (SCM). A synthetic counterfactual is constructed from countries with comparable macroeconomic characteristics to estimate what Turkey's inflation trajectory would have been in the absence of the policy change. The results reveal a sharp post-2021 inflation divergence between Turkey and its synthetic counterpart, suggesting that the surge in inflation was largely policy-induced. Placebo tests validate the statistical significance of the findings, while robustness checks confirm the stability of the results.

Keywords: Monetary policy, inflation, synthetic control method

JEL Classification: E52, E31, C21

1. Introduction

In recent years, the global economic system has faced large-scale uncertainties and crises. The 2008 Global Financial Crisis, the COVID-19 pandemic, and post-2022 geopolitical risks have led central banks to reassess the effectiveness of traditional monetary policy tools (Bernanke, 2022). In both advanced and emerging economies, interest rate policies have yielded different outcomes in achieving macroeconomic stability, making monetary policy decision-making processes increasingly complex (Bernanke and Blanchard, 2024).

In the case of Turkey, monetary policy decisions have sparked significant debates, particularly regarding inflation, exchange rate dynamics, and financial market stability. Since 2021, the Central Bank of the Republic of Turkey (CBRT) has adopted unconventional monetary policies by lowering the policy rate despite high inflation. In contrast to conventional independent monetary authorities, CBRT's policy decisions have been subject to increasing political influence in recent years. Analysts have frequently questioned the institutional autonomy of the CBRT, particularly in light of leadership changes and the alignment of monetary decisions with executive priorities. This political context has raised concerns about the credibility and effectiveness of Turkey's monetary policy framework. Between September and December 2021, the CBRT implemented a total of 500 basis points of interest rate cuts, bringing the policy rate down to 14%. According to conventional economic theories, lowering interest rates in a high-inflation environment can further fuel inflationary pressures. However, the Turkish authorities framed this policy as part of a broader strategy aimed at promoting a growth and export-oriented economic model rather than directly targeting inflation. Empirical studies have examined the relationship between inflation and monetary policy decisions in Turkey. Onaç and Birol (2024) argue that while CBRT's policy rate cuts may stimulate credit growth and short-term economic activity, they are insufficient to contain inflation in the long run. Similarly, Kara and Sarıkaya (2024) highlight that exchange rate volatility surged following the interest rate cuts, generating additional inflationary pressures. In contrast, some studies suggest that non-traditional monetary tools, such as macroprudential regulations and targeted credit expansion, may offset some negative effects of low interest rates (Tetik and Kara, 2021).

This study aims to analyze the impact of unconventional monetary policies in Turkey by employing the Synthetic Control Method (SCM), which offers a robust framework for policy evaluation. By constructing a "synthetic control group" composed of countries with similar economic characteristics, SCM allows for a more precise assessment of the causal effects of CBRT's 2021 monetary policy shifts on inflation dynamics. Unlike traditional time-series econometric models, SCM enables researchers to isolate the effects of policy changes by comparing Turkey's inflation trajectory with that of a counterfactual economy (Abadie, Diamond, Hainmueller, 2010). This study contributes to the literature by providing an alternative empirical approach to understanding monetary policy effectiveness in emerging economies. The remainder of this paper is structured as follows: The next section reviews the related literature, followed by a detailed description of the data and methodology. The empirical findings and policy implications are discussed in the final sections.

2. Theoretical and Empirical Background

2.1 Theoretical Framework: Monetary Transmission, Expectations, and Policy Credibility

Monetary policy affects inflation through multiple channels, and these channels typically operate with a time lag. In emerging markets, including Turkey, the lagged transmission mechanism shows that changes in policy interest rates take time to affect aggregate demand, exchange rates, and ultimately price levels (Taylor, 1993; Svensson, 1997). This lag is particularly critical in assessing the timing of inflation responses to interest rate cuts.

The transmission mechanism can be broken down into several interrelated channels: the interest rate channel, the credit channel, the exchange rate channel, the asset price channel, and the expectations channel (Mishkin, 1996). In Turkey, the interest rate and exchange rate channels are particularly strong due to the high sensitivity of capital flows and import prices to monetary policy developments. Lower policy interest rates stimulate domestic demand by reducing borrowing costs. At the same time, capital outflows accelerate as real interest rate differentials narrow, leading to a depreciation of the currency. However, these effects can also be influenced by external factors such as global financial conditions.

In open economies, a key component of the transmission process is exchange rate pass-through (ERPT). Devaluation of the local currency due to expansionary monetary policy increases import prices and contributes directly to inflation. In economies that are highly dependent on imported inputs and energy such as Turkey this channel is particularly strong (Özen *et al.*, 2020; Gürkaynak *et al.*, 2023). As a result, exchange rate movements are quickly reflected in domestic prices, limiting the effectiveness of interest rate cuts in efforts to stabilise inflation.

Furthermore, policy credibility and the role of expectations in inflation dynamics are of central importance. Without a credible inflation targeting regime, interest rate changes may fail to anchor expectations, leading to exchange rate volatility and inflationary spirals (Uribe, 2022; Kose *et al.*, 2012). This channel is particularly relevant in the case of Turkey, as sudden leadership changes at the central bank and deviations in communication strategies have weakened the perceived independence of the CBRT. When economic actors do not believe that the central bank is committed to price stability, even contractionary policies may lose their effectiveness, and in 2021, the CBRT's expansionary policies were destabilising due to this lack of confidence.

The expectations channel operates through the future-oriented behaviour of consumers and investors. If economic actors believe that inflation will rise, they adjust wages,

prices, and contracts accordingly, creating a self-fulfilling inflation dynamic (Blinder, 1999). The central bank's credibility is critical to breaking this cycle. In countries where political influences undermine institutional autonomy, expectation formation becomes unstable, which disrupts monetary policy transmission (Bernanke and Gertler, 1995).

Understanding these channels is essential for interpreting the impact of the CBRT's policy decisions in 2021 on inflation. This study aims to capture the direct effects of policy interest rate changes and the indirect effects arising from changes in expectations and exchange rate dynamics by applying the Synthetic Control Method.

2.2 Related Literature

The relationship between interest rates, inflation, and exchange rate dynamics has long been a focal point in macroeconomic research, particularly for emerging markets such as Turkey. In recent years, studies have increasingly emphasized the role of policy credibility, exchange rate pass-through, and delayed monetary transmission in shaping inflation outcomes. One stream of literature explores the inflation-interest rate nexus under inflation targeting regimes. For instance, Kose *et al.* (2012) show that in the Turkish context, the effectiveness of interest rate policy in containing inflation largely depends on the credibility of the central bank. Similarly, Karahan and Yilgör (2017), using Granger causality tests, provide empirical evidence of bidirectional causality between interest rates and inflation, indicating that inflation itself also affects interest rate decisions, creating a feedback loop. Closely related are studies focusing on the exchange rate-inflation link. Özen *et al.* (2020) analyze the triangle relationship between exchange rates, interest rates, and inflation, demonstrating that exchange rate depreciation significantly increases inflation through import prices. Complementing this view, Turna and Özcan (2021) employ an ARDL framework and find both short-run and long-run causality between these variables, highlighting the importance of lagged effects in policy transmission.

The theoretical underpinning of these findings is informed by both the Neo-Fisherian and Neo-Keynesian perspectives. The Neo-Fisher hypothesis argues that low nominal interest rates can reduce inflation in the long run under a credible regime (Uribe, 2022). However, Turkey's experience, where interest rates were reduced amid rising inflation expectations and political influence, contradicts this theoretical prediction. Neo-Keynesian models, such as those by Bullard and Mitra (2002) and Davig and Leeper (2007), argue that deviations from the Taylor principle and abrupt regime shifts in monetary policy can undermine determinacy, fueling inflation volatility. A related theoretical dimension involves the exchange rate pass-through and monetary transmission in small open economies.

Cushman and Zha (1997) and Galí and Monacelli (2005) present empirical and structural frameworks explaining how interest rate decisions affect inflation and output through exchange rate channels and expectations management. These dynamics are especially relevant for countries like Turkey, where monetary credibility has fluctuated over time.

From an empirical evaluation standpoint, the Synthetic Control Method (SCM) has become an increasingly valuable tool for policy impact assessment in macroeconomic settings. Initially introduced by Abadie and Gardeazabal (2003) and later expanded by Abadie, Diamond, and Hainmueller (2010), SCM facilitates the construction of a weighted combination of control units that mimic the treated unit's pre-treatment characteristics. While applications of SCM in the Turkish context are still limited, Özdurak and Uzunoğlu (2024) recently utilized the method to assess the disconnection between interest rates and inflation in Turkey, finding that unconventional monetary measures deteriorated market expectations and deepened inflationary pressures. Despite these contributions, a critical gap remains in evaluating the causal impact of the Central Bank of the Republic of Turkey's (CBRT) aggressive rate cuts in late 2021 within a robust counterfactual framework. This study addresses this gap by applying SCM to construct a "Synthetic Turkey" composed of comparable emerging markets, isolating the inflationary consequences of unconventional interest rate policy. In doing so, it builds on and contributes to the existing literature by integrating both theoretical transmission mechanisms and empirical model validation through placebo and sensitivity analyses.

3. Methodology and Data

3.1 Methodology

In this study, we apply the Synthetic Control Method (SCM), which is increasingly used to assess the effects of policy treatments. The SCM is an effective analysis tool when the treatment unit (Turkey) experiences a policy change that is not found in control units (*i.e.*, countries without similar interest rate cuts). With this method, Turkey's actual inflation path is compared with a synthetic control group to estimate the effects of interest rate cuts on inflation in 2021. The main advantage of the SCM over traditional benchmarking methods is its ability to construct a synthetic counterfactual that provides the closest possible match to the observed results in the pre-treatment period. This feature makes it possible to better account for time-varying trends and exogenous factors than traditional "difference-in-differences" methods.

In this study, September 2021, when the CBRT started the rate cut process, is considered as the treatment period. The pre-treatment period covers the years 2010–2020, when Turkey's inflation dynamics were more stable and conventional monetary policies were implemented. The control group is selected from countries similar to Turkey in terms of macroeconomic characteristics such as inflationary behavior, monetary policy framework and economic growth. The “donor pool” of these countries is optimized to create a synthetic version of Turkey. The SCM models Turkey's pre-treatment inflation path by assigning specific weights to the control countries. The weights are optimized to maximize the match between Turkey's economic indicators and those of the countries in the donor pool. In the post-treatment period, Turkey's observed inflation rate is compared with the estimated inflation rate of the synthetic control group to assess the causal impact of the CBRT's unconventional monetary policies.

The structure of the SCM can be summarized as follows: First assume that there are $C + 1$ countries observed in period T , where $i = 1, 2, \dots$, represent $C + 1$ countries and $t = 1, 2, \dots, T$ represent periods. Only $i = 1$ country has implemented a policy change, while the remaining C countries are used as the control group, *i.e.* the donor pool. The pre-treatment period is denoted by T_0 and the post-treatment period is denoted by T_1 , yielding the equality $T_0 + T_1 = T$.

The effect of unconventional monetary policies in Turkey is expressed as follows:

$$a_{it} = Y_{it}^T - Y_{it}^N \quad (1)$$

In Equation 1, Y_{it}^T represents the actual inflation rate under treatment, while Y_{it}^N represents the hypothetical inflation rate in the Non-treatment. Since only country $i = 1$ is exposed to treatment, we need to estimate $a_1(T_0 + 1), \dots, a_1$. The SCM uses the following factor model to estimate Y_{it}^N as a combination of countries in the donor pool:

$$Y_{it} = \delta_t + Z_i \theta_t + \lambda_i \mu_i + \varepsilon_{it} \quad (2)$$

In Equation 2, δ_t denotes the common factor that applies to all countries; Z_i denotes the vector of independent variables not affected by the treatment; θ_t denotes the vector of time-specific parameters; λ denotes the vector of unknown common factors; μ_i denotes country-specific unobserved factors; and ε_{it} denotes zero-mean transitory shocks.

The SCM defines a vector of weights $\mathbf{W} = [w_2, \dots, w_{C+1}]$ for the countries in the donor pool to create a synthetic control group that best matches Turkey's pre-treatment economic indicators. These weights are determined by the following optimization problem:

$$\min_W \sqrt{(\mathbf{X}_1 - \mathbf{X}_0 \mathbf{W})^T \mathbf{V} (\mathbf{X}_1 - \mathbf{X}_0 \mathbf{W})} \quad (3)$$

In Equation 3, \mathbf{X}_1 represents Turkey's vector of economic indicators in the pre-intervention period and \mathbf{X}_0 represents the matrix of economic indicators of the donor pool countries. \mathbf{V} is a symmetric and positive semi-definite matrix. The optimization process is subject to the condition that the weights assigned to each country are between 0 and 1 and the sum of the weights is equal to 1. The accuracy of the SCM's predictions is assessed by the Mean Squared Prediction Error (MSPE). The MSPE before and after the intervention is calculated as follows;

$$MPSE_{(PRE)} = \sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} (Y_{1t} - \sum_{j=2}^{C+1} w_j Y_{jt})^2} \quad (4)$$

$$MPSE_{(POST)} = \sqrt{\frac{1}{T_1} \sum_{t=T_0+1}^T (Y_{1t} - \sum_{j=2}^{C+1} w_j Y_{jt})^2} \quad (5)$$

The measures in equations 4 and 5 are used to assess the discrepancy between Turkey's actual inflation rate and the inflation rate estimated by the synthetic control group.

3.2 Data

The data set used in this study is compiled from reliable and internationally recognized sources to assess the effects of Turkey's inflation and interest rate policies. The data are obtained from the Central Bank of the Republic of Turkey (CBRT) and the International Monetary Fund (IMF) databases. The annual rate of change in the consumer price index (CPI) is used as the inflation rate. Other variables used in the model are policy interest rate, money supply, exchange rate and energy prices, respectively. The policy interest rate is calculated over monthly average values. In order to analyze the effects of monetary policies on inflation more comprehensively, the broad money supply indicator (M2) is also included in the data set. Moreover, an exchange rate variable is included to analyze the effects of exchange rate volatility on inflation through import prices. Finally, for the Turkish economy, which is heavily affected by energy costs, oil prices are also included in the dataset to include the inflationary effects of changes in commodity prices.

In the analysis, September 2021, when the CBRT started to implement interest rate cut policies, is taken as the treatment period. The pre-treatment period covers the years 2010-2020. This period reflects a period of relatively conventional monetary policies and more stable inflation dynamics in Turkey. The analysis is based on annual data. This decision is motivated by both practical and methodological considerations. Annual data facilitate the examination of medium- and long-term trends by smoothing out short-term fluctuations

and minimizing noise from temporary shocks. More importantly, using annual frequency ensures greater consistency and comparability across countries in the donor pool. Although quarterly macroeconomic data may offer finer resolution for capturing short-run dynamics, harmonized and complete quarterly series are not always readily accessible for all countries in the donor pool. Due to this potential heterogeneity in data coverage, relying on annual data provides a more balanced and stable basis for constructing the synthetic control group, thereby supporting the internal validity of the analysis. However, we recognize that this choice entails a trade-off. The use of annual data may limit the ability to detect immediate policy effects and short-term inflationary responses. As a result, the empirical findings should be interpreted in light of this limitation. Moreover, the use of annual frequency helps mitigate measurement noise and temporary fluctuations that could obscure the structural treatment effect, particularly in the context of volatile emerging market economies where monthly data are subject to significant seasonal adjustments and revisions.

Within the scope of the synthetic control method, in order to better analyze the impact of Turkey's unconventional monetary policies, countries with similar economic characteristics to Turkey were selected as the control group. Some basic macroeconomic indicators were taken into account in determining the control countries. The first criterion is the inflation rate. In this framework, countries with similar annual inflation rates to Turkey's were preferred. The second criterion is the growth rate. Similarity in terms of economic growth dynamics was an important selection criterion. The last criterion is interest rate policies. Countries with similar policy instruments and effects to Turkey were taken into consideration.

In this framework, emerging market economies such as Brazil, Romania, Hungary and South Africa were selected for the control group due to their economic fragility and similar macroeconomic problems with Turkey. In addition, countries such as Poland, Chile, Mexico, Indonesia, Malaysia and Argentina are included in the donor pool to increase the robustness of the synthetic control model and to provide a broader basis for comparison. The different economic structures of the countries in the donor pool increased the generalizability of the synthetic control model and supported the reliability of the results.

3.3. Data and Variable Justification

This section clarifies the theoretical and empirical relevance of the selected variables in the synthetic control model. The inclusion of the policy interest rate is based on its central role in influencing both capital flows and inflation expectations. The exchange rate reflects external competitiveness and import cost dynamics, especially in economies highly depen-

dent on energy and intermediate goods. Broad money supply (M2) captures liquidity conditions and potential inflationary pressures stemming from monetary expansion. Oil prices are included due to Turkey's high dependency on imported energy and their direct influence on production costs and CPI. These variables are widely used in the literature to model inflationary dynamics in emerging economies (Taylor, 1993; Galí and Monacelli, 2005; Bernanke, 2022).

4. Findings

4.1 Pre-treatment fit and Synthetic Türkiye

In order to ensure the validity of the SCM, Turkey's economic indicators and the values of the synthetic control group should be highly consistent in the pre-treatment period. In this study, the synthetic control group created to forecast Turkey's inflation rate is optimized based on variables such as policy rate, real GDP, broad money supply (M2), exchange rate and oil prices for the period 2010–2020. The countries in the donor pool and their weights in the construction of synthetic Turkey are presented in Table 1.

Table 1: Countries and Weights in Synthetic Turkey's Donor Pool

Countries	Weights (%)
Argentina	0.249
Brazil	0.001
Chile	0.008
Hungary	0.012
Indonesia	0.004
Malaysia	0.003
Poland	0.681
Romania	0.041
South Africa	0.001

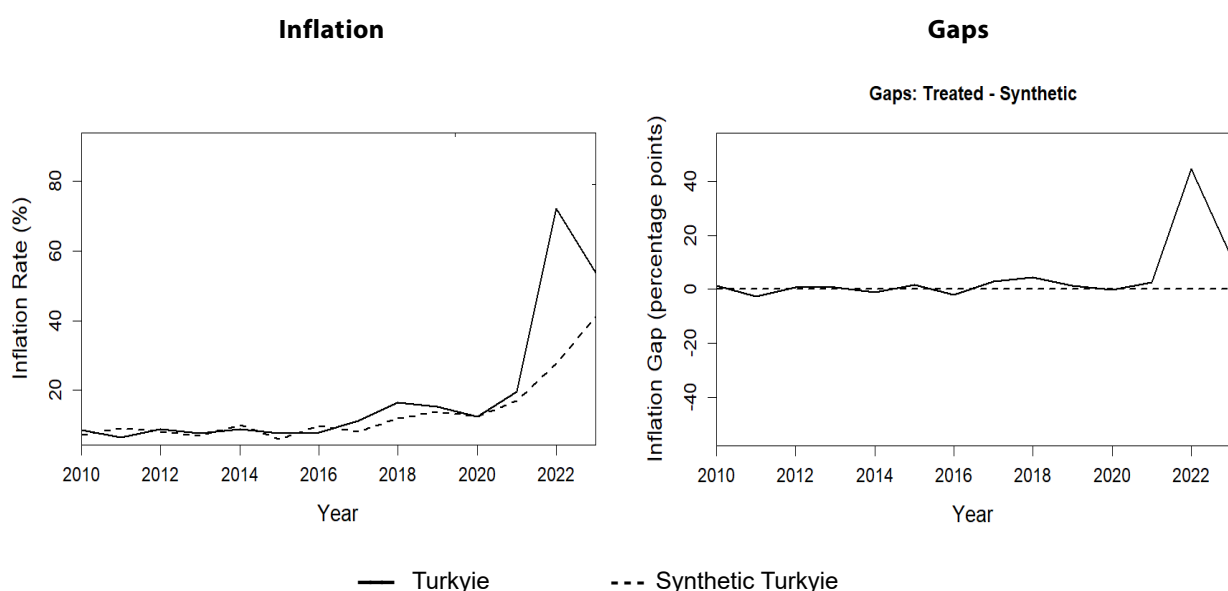
Source: Authors' own calculations based on IMF and CBRT data

The findings in Table 1 show the weights of the countries included in the donor pool in the synthetic control model used to analyze Turkey's inflation dynamics. In the model, Poland (68.1%) has the highest weight as the country most similar to Turkey's economic and macroeconomic indicators. Following Poland, Argentina (24.9%) stands out as the second country that contributes the most to explaining Turkey's characteristics. The weights of the countries other than these two countries are quite low (*e.g.*, Hungary 1.2% and Indonesia 0.4%) and appear to bear limited resemblance to Turkey's economic characteristics.

These findings support the “economic and structural similarity” criteria frequently emphasized in the literature. The fact that Poland has a high weight in Turkey's donor pool reveals that the similarities in the economic structures of the two countries are decisive. On the other hand, the fact that Argentina has volatile inflation processes like Turkey makes its inclusion in the model meaningful. However, the low weights of the other countries indicate that they make a limited contribution in explaining Turkey's unique economic and macroeconomic dynamics.

These results suggest that the synthetic control model is correctly constructed and provides an appropriate donor pool to compare Turkey's inflation dynamics with similar structures on a global scale. In this context, further analysis with the countries that stand out in the model provides an important reference point to better understand the reasons behind Turkey's post-2020 inflationary fluctuations.

Figure 1: Comparison of Turkey and Synthetic Turkey's Inflation Rates (2010–2023)



Note: Left panel: Real and Synthetic inflation rates; Right panel: Inflation gap (real – synthetic)

Source: Authors' own calculations based on IMF and CBRT data

Figure 1 compares Turkey's inflation rates with those of Synthetic Turkey, which is composed of countries with similar economic characteristics. The left panel shows the annual inflation rates of Turkey and Synthetic Turkey, while the right panel shows the inflation difference between the two structures.

The left panel allows for a comparison of Turkey's inflation dynamics with the control group. During the 2010–2020 period, Turkey's inflation rates are largely consistent with those of Synthetic Turkey. This indicates that the control group created using the Synthetic Control Method (SCM) accurately models Turkey's past economic performance. The model's low Mean Squared Prediction Error (MSPE = 4.62) in the pre-treatment period also confirms the quality of this alignment. However, this alignment has deteriorated in the post-2020 period, and Turkey's inflation rates have deviated significantly from Synthetic Turkey, especially since 2021.

The sharp increase in inflation rates in Turkey since 2021 has been linked to the Central Bank of Turkey's (TCMB) shift to unconventional monetary policies. In particular, the reduction of policy interest rates amid rising inflationary pressures and the adoption of the 'interest rates cause inflation' approach have undermined market confidence and exacerbated inflationary pressures. While Turkey's inflation rates have been affected by external factors such as post-pandemic global supply chain issues and rising energy prices, the fact that inflation in Turkey has risen much faster than the control group suggests that this increase is largely due to internal factors such as the TCMB's policies. However, external factors such as global economic conditions should not be overlooked in this dynamic. Economic literature indicates that unconventional monetary policies undermine market confidence and threaten macroeconomic stability (Taylor, 1993; Bernanke and Mihov, 1998). In the case of Turkey, exchange rate fluctuations following interest rate cuts have increased import costs and further intensified inflationary pressures.

The right panel shows the differences between Turkey's inflation rate and Synthetic Turkey. These differences were quite low and stable during the 2010–2020 period, but have grown rapidly since 2020. In particular, the peak in 2021–2022 clearly reveals the impact of unusual monetary policies. According to our SCM forecasts, cumulative inflation in Turkey during the 2021–2023 period will be approximately 45 percentage points higher than the synthetic control group, highlighting the significant impact of the unusual monetary policy easing. Interest rate cuts since 2021 have not been seen as consistent with the long-term price stability objective by market actors, leading to significant fluctuations in exchange rate and inflation dynamics. While countries in the synthetic control group also experienced pandemic-induced economic shocks, their adherence to traditional monetary policy tools limited the growth of inflation differentials.

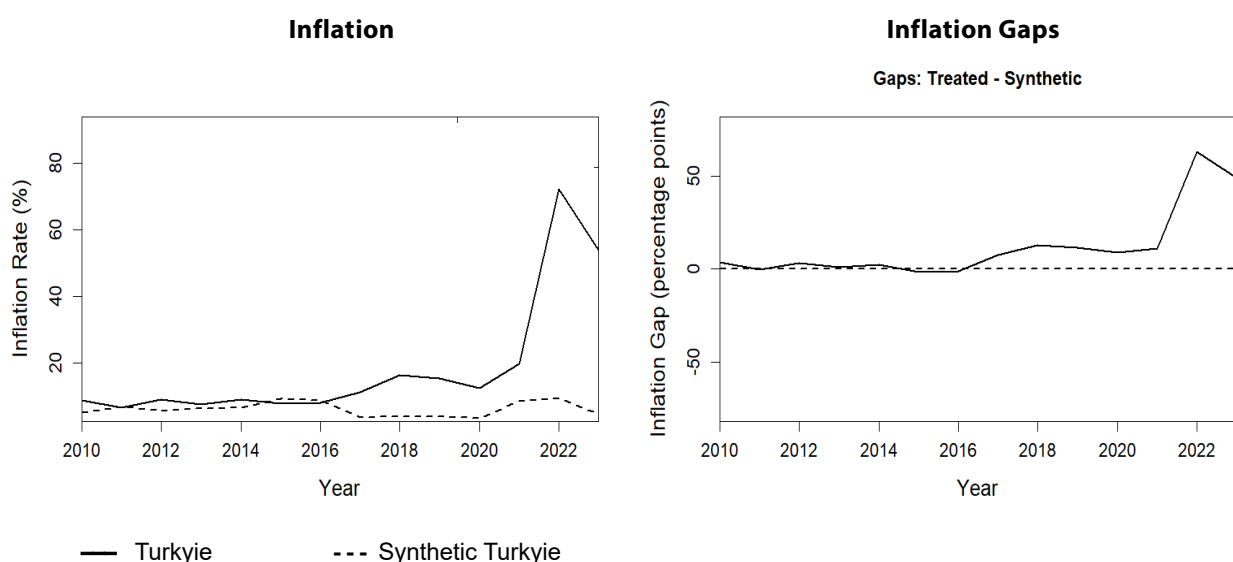
These findings are consistent with Özdurak and Uzunoğlu's (2024) analysis based on regime switching models. Their study highlights that Turkey's deviation from traditional interest rate policies after 2021 weakened market expectations and accelerated inflation. This result is also supported by our SCM-based counterfactual assessment.

These results show how unusual monetary policies, especially under the shadow of political influences on the CBRT, have undermined market confidence and threatened macroeconomic stability. In the literature, studies on the effect of interest rates on inflation (*e.g.*, Svensson, 1997; Taylor, 1993) emphasise that inflationary pressures may increase if monetary policy tools are not used effectively. In the case of Turkey, policy uncertainties and unconventional approaches, such as the interest rate cuts implemented by the CBRT in 2021, have led to significant market volatility and caused large inflation differences compared to the control group.

4.1 In-Time Placebo Test

The in-time placebo test was conducted by choosing 2015 as the treatment year to assess whether the treatment effect is indeed specific to the treatment period. This method aims to understand whether the impact of the interest rate cut policies and unconventional monetary policies realized in 2021 on the Turkish economy is unique to the relevant period. Figure 2 shows the results obtained using 2015 as the pseudo-treatment year:

Figure 2: In-Time Placebo Test Results Using 2015 as a Sham Treatment Year



Note: Left panel: Real and Synthetic inflation rates; Right panel: Inflation gap (real – synthetic)

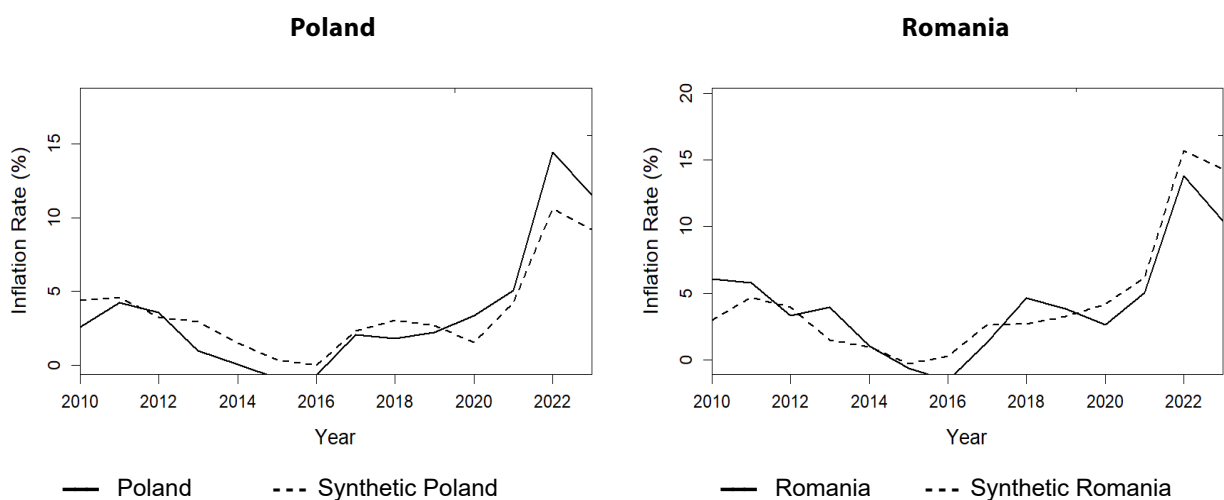
Source: Authors' own calculations based on IMF and CBRT data

Figure 2 shows the inflation rates of Turkey and Synthetic Turkey for the 2015 sham treatment period. When the 2015 sham treatment period is selected, it is noteworthy that the inflation differentials between Turkey and Synthetic Turkey do not deviate significantly. The observed differences can be explained by natural fluctuations arising from global economic conditions in both Turkey and the control group. These results suggest that the treatment effect is not valid for a different period such as 2015, and therefore, the interest rate cut policies that started in 2021 had a direct impact. Moreover, the post/pre MSPE ratio in the 2015 placebo setting remained moderate (5.75), supporting the inference that the inflation spike is indeed specific to the 2021 period. In other words, the dramatic increase in inflation is an effect specific to the period when interest rate cuts and unconventional policies started to be implemented. This is consistent with the “timing of policy shocks” that is frequently discussed in the literature. It is clear that Turkey's rate cut process, which started in 2021, seriously distorted market expectations and increased inflation. The absence of such an effect in a different period such as 2015 confirms the critical role of policy changes and market confidence on inflation.

4.2 In-Space Placebo Test

The In-Space Placebo Test was conducted to test whether Turkey's post-treatment inflation increase is also observed in other similar countries. In this context, Poland and Romania were selected and analyzed as the countries with the closest economic and structural characteristics to Turkey. The aim is to assess whether the treatment effect is unique to Turkey.

Figure 3: In-Space Placebo Test – Real vs Synthetic Inflation for Poland and Romania



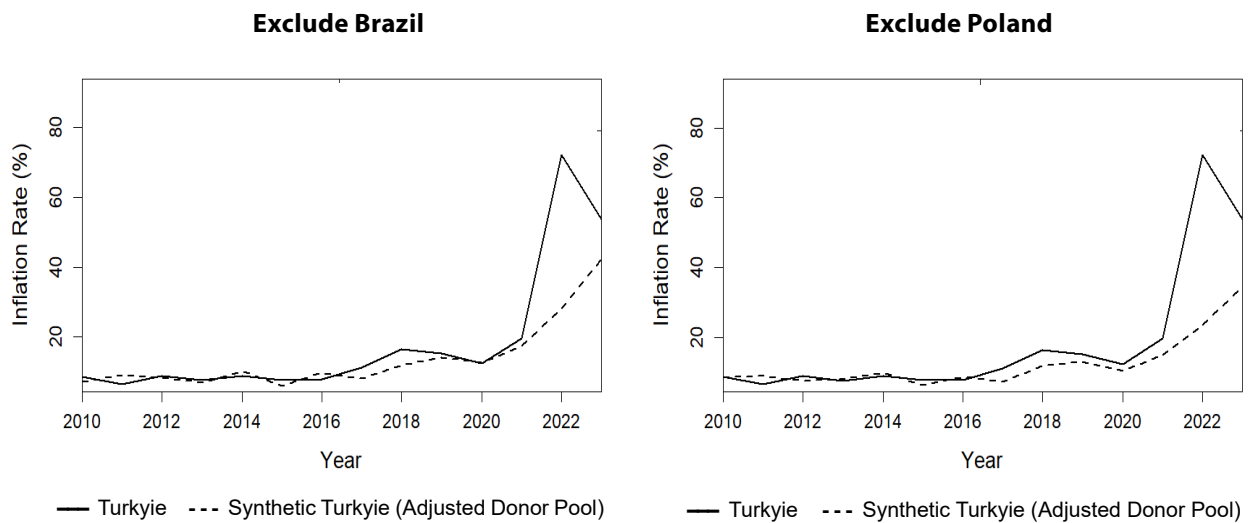
Source: Authors' own calculations based on IMF and CBRT data

Figure 3 compares real and synthetic inflation rates for Turkey, Poland and Romania. The figure clearly shows that there is no significant difference between real and synthetic inflation rates in Poland and Romania. Turkey's interest rate cut policies, which started in 2021, caused inflation rates to rise significantly compared to synthetic Turkey. However, in Poland and Romania, there is no significant difference between real and synthetic inflation rates despite the global economic challenges and the effects of the pandemic during this period. This suggests that the dramatic increase in inflation observed in Turkey was largely the result of endogenous policy choices and unconventional monetary policies. The post/pre MSPE ratios for Poland and Romania were relatively low (*e.g.*, Poland: 1.44; Romania: 2.50), indicating that inflation trends in these countries were stable and did not diverge from their synthetic controls.

Poland and Romania continued to use more traditional and market-friendly monetary policy tools, which allowed them to maintain economic stability. The parallel course of real and synthetic inflation rates in these countries can be attributed to the predictability of their policies and the preservation of market confidence. Figure 3 shows that the treated effect is unique to Turkey. In Poland and Romania, there was no treatment similar to Turkey's interest rate cut policies and therefore no synthetic control deviation in inflation rates was observed. These findings confirm that the loss of market confidence and the increase in inflation caused by Turkey's interest rate cut policy cannot be generalized to other countries, but only stem from Turkey's policy choices.

4.4 Sensitivity Analysis

The sensitivity analysis to assess the robustness of the SCM started with the exclusion of Poland, one of the highest weighted countries in Turkey's synthetic control group, from the donor pool. The model was rerun after Poland was removed and the effects on Turkey's inflation trends were observed. Similarly, the same procedure was performed for Brazil and the changes in the structure of synthetic Turkey were assessed.

Figure 4: Trends After Excluding Brazil (Left) and Poland (Right) from Donor Pool

Source: Authors' own calculations based on IMF and CBRT data

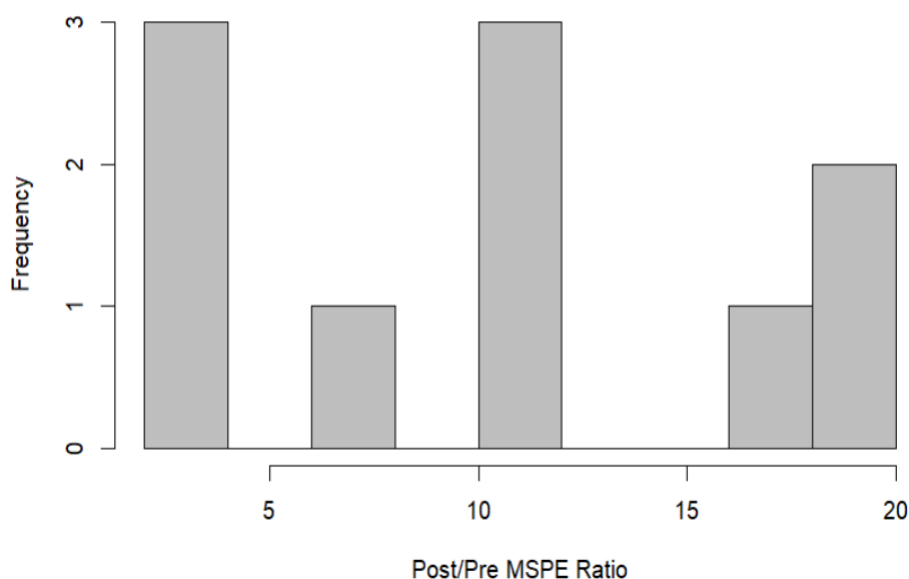
As shown in Figure 4, the removal of Poland and Brazil from the donor pool leads to some changes in the structure of the synthetic Turkey, but the overall trend and results are broadly similar. This result suggests that the sensitivity of the SCM model to the results is low and the exclusion of specific countries from the selected donor pool does not significantly affect the overall findings. The model's resilience even after excluding Poland, which had the highest weight (68%), confirms the robustness of the synthetic match. In particular, the fact that Poland, in spite of having a significant weight in the synthetic control group of Turkey, consistently maintains the model's results on inflation trends even when excluded provides strong evidence of the robustness of the methodology. Similarly, the exclusion of Brazil did not change the direction or underlying trends of the model's results.

These findings suggest that the SCM is a sensitive methodology and that the results are not solely dependent on the effects of countries in a particular donor pool. Therefore, it can be said that the model provides a reliable framework for assessing the effects of unconventional monetary policies on inflation in Turkey. This can be considered as a robustness test that supports the main claims of the study. It also indicates that the donor pool used in the analysis is homogeneous and appropriately selected.

4.5 Permutation Test and Statistical Significance

In order to statistically validate the causal impact of the 2021 interest rate cuts on inflation, we conduct a permutation (placebo) test. In this approach, each country in the donor pool is re-assigned as if it were “treated” in 2021, and the Synthetic Control Method is re-estimated for each one. This generates a distribution of post/pre-treatment MSPE ratios under the null hypothesis of no treatment effect.

Figure 5: Distribution of Post/Pre MSPE Ratios from Placebo Tests



Source: Authors' own calculations based on IMF and CBRT data

Figure 5 presents the histogram of these MSPE ratios. The vertical axis shows the frequency of occurrence, and the horizontal axis represents the magnitude of post/pre MSPE ratios across placebo countries. Turkey's ratio is located in the upper tail of the distribution (approximately between 18–20), significantly higher than that of other placebo countries.

This result indicates that the inflation surge in Turkey following the 2021 policy change is not a product of random fluctuations or global shocks that affected all countries similarly. Instead, the treatment effect observed for Turkey is statistically distinguishable from the control group, thereby reinforcing the conclusion that the inflationary impact was largely endogenous and policy-driven.

To support this visual evidence, we calculated Turkey's pre-treatment MSPE as 4.44 and the post-treatment MSPE as 722.62, resulting in an MSPE ratio of 162.77. This drama-

tic difference indicates that the inflation surge in Turkey following the 2021 policy change is not a product of random fluctuations or global shocks that affected all countries similarly. Instead, the treatment effect observed for Turkey is statistically distinguishable from the control group, thereby reinforcing the conclusion that the inflationary impact was largely endogenous and policy-driven.

Similar methods have been employed in studies such as Abadie *et al.* (2010) and Cavallo *et al.* (2013), where the relative MSPE ratio serves as a non-parametric test statistic. According to their guidelines, if the treated unit lies in the extreme tail of the distribution (as is the case for Turkey) the effect can be considered statistically significant at conventional confidence levels.

4.6 Confounding Factors: Alternative Macroeconomic Influences

Although the Synthetic Control Method is designed to isolate the causal impact of interest rate cuts on inflation by constructing a counterfactual scenario, it is important to acknowledge other concurrent macroeconomic developments that may have influenced the observed inflation dynamics in Turkey. These include fiscal policy expansions, global energy price shocks, and capital flow restrictions.

During the post-2020 period, Turkey also implemented expansive fiscal policies, including increased public spending, social transfers, and credit guarantees. While these measures were partly aimed at supporting post-pandemic recovery, they may have contributed to aggregate demand pressures and inflation. However, similar fiscal expansions were also observed in many countries in the donor pool, which helps mitigate the confounding risk.

The global surge in energy prices (particularly in 2021 and 2022) exerted upward pressure on inflation in many economies¹. Nevertheless, this shock was largely exogenous and simultaneously affected both Turkey and the donor countries. Given that the synthetic control group is subject to the same external shocks, the divergence observed in Turkey's inflation remains attributable primarily to domestic monetary policy changes.

In response to exchange rate pressures, Turkish authorities introduced various forms of capital flow management and unorthodox exchange rate interventions (*e.g.*, FX-protected

1 For instance, in response to the energy crisis during 2022–2023, some countries such as Poland implemented temporary price caps, energy subsidies, or reduced VAT/excise taxes on fuel and utilities. These government interventions may have temporarily lowered headline inflation and thus complicate direct cross-country comparisons.

deposit schemes, direct market sales). These interventions likely distorted price signals and eroded monetary credibility, further amplifying inflation. However, such measures were not mirrored by most countries in the donor pool, reinforcing the notion that Turkey's inflation trajectory post-2021 reflects idiosyncratic policy choices. It is important to note that while global energy price shocks affected all countries in 2021–2022, their transmission to domestic inflation varied significantly due to differences in policy responses. Some donor pool countries (*e.g.*, Poland and Hungary) implemented temporary energy subsidies, price caps, and reduced VAT rates on fuel and utilities, which dampened headline inflation temporarily. In contrast, Turkey allowed energy prices to be largely reflected in consumer prices, contributing to higher measured inflation. However, these fiscal measures in donor countries were typically phased out by 2023, suggesting that the persistent divergence observed in Turkey's inflation trajectory is primarily attributable to sustained monetary policy choices rather than differential short-term fiscal responses to energy shocks. In sum, while these confounding factors played a role in shaping macroeconomic outcomes, the divergence between Turkey and its synthetic counterpart is still best explained by the deviation from conventional monetary policy practices.

5. Conclusion

This study investigates the inflationary effects of the unconventional monetary policy decisions implemented by the Central Bank of the Republic of Turkey (CBRT) beginning in September 2021, using the Synthetic Control Method (SCM). The findings suggest that these policy changes were followed by a significant deviation in Turkey's inflation trajectory compared to a synthetic control group constructed from similar emerging market economies.

During the pre-treatment period, Turkey's inflation path closely mirrored that of the synthetic control group, indicating a strong match. However, in the post-treatment period, a clear divergence emerged, with Turkey experiencing markedly higher inflation. This divergence appears to be associated with shifts in monetary policy stance and may have been amplified by factors such as exchange rate depreciation and rising energy prices.

To assess the robustness of the results, we conducted in-time and in-space placebo tests. These tests confirmed that the observed inflation surge in Turkey was not mirrored in donor countries that maintained conventional monetary frameworks, such as Poland and Romania. Sensitivity analyses further demonstrated that excluding individual countries from the donor pool did not materially alter the results, thereby enhancing the reliability of our conclusions.

Nevertheless, several limitations should be acknowledged. First, the use of annual data, while providing cross-country comparability and reducing short-term noise, limits our ability to capture the immediate transmission dynamics of monetary policy changes that occurred in September 2021. Second, although we control for major confounding factors such as energy price shocks and fiscal interventions, unobserved heterogeneity in policy implementation across countries may still influence the results. Future research employing higher-frequency data and more granular policy measures could provide additional insights into the precise timing and channels of monetary transmission in emerging markets.

These findings offer important implications for economic policy design. The results highlight the risks of implementing unconventional monetary policies in an environment where market expectations are fragile. Such policies, if implemented without a consistent framework, can undermine investor confidence and lead to long-term macroeconomic instability. In developing economies like Turkey, credibility and consistency in monetary policy are critical for maintaining price stability and promoting sustainable growth. The example of Turkey, particularly in the shadow of political interventions targeting the CBRT, clearly highlights the importance of central bank independence and the management of market expectations. A credible monetary policy framework is indispensable for maintaining the effectiveness of policy tools and preventing self-reinforcing inflation cycles.

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