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Flexible Boundaries: Evaluating the Effect of Escape Clause Activation*

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Abstract

This paper investigates the impact of escape clause (EC) activation within fiscal rule (FR) frameworks, focusing on macroeconomic and financial variables. Leveraging the Synthetic Control Method (SCM), we estimate the effects of EC activation on debt-to-GDP ratios, the Emerging Markets Bond Index (EMBI), and Credit Default Swaps (CDS). Our analysis spans both emerging and advanced economies that activated ECs during major shocks, including the Global Financial Crisis and the COVID-19 pandemic. A key methodological contribution is the integration of machine learning-based clustering techniques to enhance donor pool selection, thereby strengthening the robustness of SCM estimates. The findings reveal that EC activation lowers debt levels, reduces sovereign risk premiums, and increases fiscal space, with effects on financial variables persisting for two to twelve months. These results underscore the dual role of ECs in enabling fiscal flexibility while safeguarding the fiscal discipline objectives embedded in FR frameworks.

Keywords: Fiscal rules, Fiscal policy, Escape Clauses, Flexibility.

JEL Codes: E62, H61, H68

*The findings and interpretations in this paper are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank or the governments it represents.

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1 Introduction

Fiscal rules (FR) have become a widely adopted mechanism to mitigate excessive deficits and address time inconsistency in fiscal policy. Currently, around 106 countries have implemented at least one type of FR, which targets various macroeconomic aggregates such as debt, expenditure, revenues, and fiscal balances (both unadjusted and adjusted by the economic cycle). By imposing these constraints, fiscal rules aim to enhance the sustainability of public finances. However, recent global shocks, including the COVID-19 pandemic and increasingly frequent natural disasters, have tested the efficacy of these frameworks. While FRs can be optimized to maximize their benefits, balancing flexibility to respond to such shocks within existing FR frameworks remains a significant challenge.

The optimal FR should ideally be simple, flexible, and enforceable (Kopits and Symansky, 1998; Schaechter et al., 2012; Debrun and Jonung, 2019). However, achieving all three goals simultaneously presents a challenge, often referred to as a trilemma. Debrun and Jonung (2019) argue that simple and enforceable rules tend to overlook economic realities, leading to inflexibility. Conversely, rules that are both simple and flexible are difficult to enforce, as flexibility requires tolerance for deviations from strict numerical limits. Lastly, making rules both flexible and enforceable often introduces complexity, as detailed provisions are needed to close enforcement loopholes, such as exceptions and escape clauses (ECs)[1]. Despite the inherent complexity, maintaining flexibility is essential and can be managed through well-designed ECs that minimize discretionary interventions. Before considering how to improve EC design, it is important to first evaluate whether their activation delivers seizable macroeconomic benefits.

This paper investigates the impact of EC activation on both low-frequency variables, such as the debt-to-GDP ratio, and high-frequency variables, such as the Emerging Markets Bond

[1]Escape clauses allow temporary deviations from fiscal targets during exceptional circumstances, like economic crises, without undermining the overall fiscal framework. By defining clear conditions for activation and steps for returning to compliance, ECs balance flexibility with fiscal credibility and long-term sustainability.

Index (EMBI) and Credit Default Swaps (CDS). Using the Synthetic Control Method (SCM), we analyze the hypothetical trajectories of these variables had ECs not been activated. Our findings suggest that EC activation positively influences macroeconomic outcomes: without activation, countries would likely have experienced higher debt-to-GDP ratios and increased financial market risk. In essence, EC activation provides substantial economic benefits.

Our analysis focuses on both emerging and advanced economies that have activated their ECs, examining the macroeconomic environment, incentives for activation, and differing motivations across countries. We investigate the impact on three distinct variables: the debt-to-GDP ratio (an annual measure) and the EMBI and CDS (daily measures). This comparison enables us to capture the effects of EC activation at both low and high frequencies, reflecting two dimensions of FR effectiveness—sustainability of public finances and signals of fiscal discipline to markets. Notably, only 53 countries have incorporated ECs into their FR frameworks, and of these, only 18 have activated them, primarily during major shocks like the Global Financial Crisis (GFC) and the COVID-19 pandemic (see Davoodi et al. (2022)).

The use of the SCM as the methodology is driven by its suitability for measuring the effects of EC activation. By treating EC activation as the intervention, we construct a synthetic country to estimate the debt-to-GDP ratio, EMBI and CDS levels that would have prevailed without activation. The longer post-treatment period for countries that activated their ECs during the GFC allows for a more detailed observation of low-frequency macroeconomic variables, such as debt-to-GDP. In contrast, the shorter post-treatment window for countries that activated during the pandemic enables us to exploit high-frequency financial variables and capture market reactions, particularly through daily EMBI and CDS data.

A key novelty in this paper is the use of machine learning-based clustering techniques to refine the donor pool selection in the SCM framework. By employing advanced clustering methods—such as Hierarchical, Spectral, BIRCH, and K-Means—we enhance the accuracy and robustness of the synthetic control group. This approach ensures that the donor pool is constructed based on relevant economic and financial similarities. This integration of machine learning techniques significantly improves the precision of our estimates and sets our methodology apart from previous studies.

Our results consistently show that EC activation significantly influences macroeconomic outcomes. Specifically, activating escape clauses results in lower debt levels, reduced interest rates, and increased fiscal space for additional borrowing when needed. In all cases, EC activation contributes to a reduction in interest rates by 0.5 to 2 percentage points, with effects lasting between two and twelve months. These results, in both direction and magnitude, are not endogenous to the year of the shock, the country, or the control group—whether from another continent or a combination of LAC and other regions. This confirms that the observed outcomes are neither random nor the result of an ad hoc selection of countries, shocks, or controls.

This paper contributes to the literature on fiscal rules, with a specific focus on their design and implementation. The positive fiscal outcomes associated with fiscal rules have been widely studied across various types of economies, with research examining how specific design features can amplify these benefits (Caselli and Reynaud, 2020; Beetsma et al., 2019; Burret and Feld, 2018; Nerlich and Reuter, 2015; Tapsoba, 2012; Fatás and Mihov, 2006). One of the most recent innovations in this area is the inclusion of ECs, part of the second generation of fiscal rules.[2] These rules were introduced to better balance sustainability and flexibility, especially when countries face economic shocks (Schaechter et al., 2012).

Flexibility in fiscal rule frameworks has taken several forms, allowing governments to respond to business cycle fluctuations or broader economic shocks. Common mechanisms include cyclically adjusted targets, explicit exclusions of certain investment items from fiscal targets, and ECs. However, unlike cyclically adjusted targets or exclusions—where the

[2]Second-generation fiscal rules, introduced after the global financial crisis, aim to enhance flexibility and enforceability while balancing fiscal sustainability with economic stabilization. Unlike first-generation rules, which lacked clarity on the use of ECs and returning to compliance, second-generation rules specify detailed conditions, procedures, and correction mechanisms, reducing policy uncertainty and providing clear operational guidance during crises.

mechanisms are predefined—ECs must be activated to produce observable effects. This makes EC activation a unique tool in fiscal policy, as its impact is determined not only by its design but also by the conditions under which it is triggered. At the same time, excessive reliance on flexibility mechanisms, if poorly monitored, can encourage creative accounting practices, which pose significant risks to fiscal transparency and policy credibility by obscuring the true fiscal position of governments and undermining the effectiveness of fiscal rules (Milesi-Ferretti, 2004). Thus, understanding the effectiveness of ECs requires examining both their design and their activation, a topic that remains underexplored in the literature.

Existing research on ECs largely focuses on their inclusion in global fiscal rule frameworks, with mixed findings depending on the type of economy. Some studies show that including ECs can affect the likelihood of compliance with fiscal rules (Reuter, 2019; Ulloa-Suárez, 2023; Ardanaz et al., 2024). Additionally, ECs can enhance recovery from economic shocks. For instance, Grosse-Steffen et al. (2021) argue that ECs are critical to the effectiveness of fiscal rules, suggesting that these clauses magnify the benefits of fiscal frameworks. This result aligns with the theoretical contribution of Halac and Yared (2020), who demonstrate that ECs are optimal in environments with highly volatile shocks and low costs of triggering. Meanwhile, other studies explore the role of ECs in addressing the procyclicality of fiscal rules and their capacity to respond to business cycle fluctuations (Barbier-Gauchard et al., 2021; Bova et al., 2014). However, the findings suggest that ECs do not always prevent procyclical fiscal policies, as they are typically designed to respond to extreme exogenous shocks, such as natural disasters, rather than common cyclical fluctuations. Moreover, as highlighted by Heinemann et al. (2016), the credibility of fiscal rules, including ECs, plays a central role in shaping expectations of both policymakers and market participants, influencing the likelihood of compliance and the effectiveness of fiscal frameworks.

A potential reason for these mixed findings lies in the varying design of ECs. Many EC frameworks lack clear guidelines on what constitutes a qualifying event for activation, leading to inconsistent applications (Bova et al., 2014; Schaechter et al., 2012). While the inclusion of ECs signals an intention to provide flexibility during exceptional circumstances, it is crucial to assess whether the activation of these clauses, rather than their mere presence in fiscal frameworks, is what ultimately generates economic benefits.

This paper addresses this gap by focusing on the activation of ECs rather than their design alone. Our contribution is to demonstrate that it is not just the inclusion of ECs but their actual activation that has measurable and significant effects on macroeconomic outcomes. By quantifying the impact of EC activation, we provide evidence of how much activation matters in maintaining fiscal discipline and stabilizing economies during exceptional circumstances.

The structure of the paper is as follows: Section 2 outlines the role of ECs as instruments of flexibility within fiscal rule frameworks. Section 3 describes the data and methodology employed in the analysis. Section 4 presents the main findings, while Section 5 evaluates their robustness through additional checks. Finally, Section 6 offers concluding remarks and policy implications.

2 Escape Clauses as tools for flexibility in fiscal rules frameworks

By design, FRs are intended to impose permanent constraints on fiscal policy through numerical ceilings or targets on macroeconomic aggregates. To be credible, these rules must demonstrate a strong commitment to constraining fiscal aggregates over extended periods, effectively mitigating the deterioration of public finances and countering the deficit bias that arises from discretionary actions. However, no country is immune to exceptional circumstances, such as severe economic slowdowns, emergencies, or natural disasters, which demand flexibility in FR frameworks. As Kopits and Symansky (1998) emphasizes, one of the key characteristics of a model FR is flexibility, which allows rules to accommodate exogenous shocks beyond the control of policymakers.

The first generation of FRs incorporated flexibility primarily through balanced-budget rules that allowed for cyclical deviations over a medium-term horizon, enabling the operation of automatic stabilizers. The second generation expanded this flexibility by introducing ECs, which permit temporary deviations from fiscal targets during rare and unforeseen crises. Unlike cyclically adjusted targets or exclusions for public investment, ECs are designed explicitly for exogenous shocks, providing flexibility when needed.

Incorporating flexibility into fiscal frameworks reveals both advantages and challenges, particularly regarding the risk of flexibility devolving into discretion. There are currently three primary mechanisms for embedding flexibility into FRs: targeting cyclically adjusted or structural balances, excluding certain items (e.g., public investment) from fiscal ceilings, and implementing ECs. While the first two mechanisms support stabilization by accounting for temporary factors and economic shocks, they often involve complex operational adjustments. Defining cyclical adjustments or temporary exclusions is technically challenging and can lead to discretion or manipulation, complicating the communication and monitoring of these rules.

ECs, in contrast, offer a more direct approach to flexibility. Typically defined during the rule's design or through legal procedures, ECs can provide practical flexibility, as they are triggered only when needed and for limited durations. Despite their advantages, poorly defined ECs—lacking clear activation triggers and paths back to compliance—can undermine their effectiveness. This is why proper design and clear guidelines ensure ECs serve their intended purpose without jeopardizing long-term fiscal sustainability (Debrun et al., 2008).

Of the 105 countries that implemented FRs between 1985 and 2021, 53 include ECs, yet only 18 countries have activated them. These activations are heavily concentrated in two periods—2008-2011, during the Global Financial Crisis (GFC), and 2020-2021, during the COVID-19 pandemic. Both periods were characterized by severe, exogenous shocks that required large-scale fiscal responses far beyond the scope of ordinary business cycle fluctuations. EC activation during these periods was crucial in allowing governments to temporarily suspend fiscal targets to address these extraordinary circumstances.

Like economic crises, natural disasters represent another type of exogenous shock where ECs play a critical role. Such events demand immediate and significant fiscal intervention, from emergency relief to infrastructure repair. ECs provide the necessary flexibility for governments to respond quickly, allowing for deviations from fiscal targets while ensuring a structured return to fiscal discipline once the crisis subsides.

To assess the economic impact of EC activation, the following section delves into how to measure the effects of this activation on key macroeconomic and financial variables. By examining whether EC activation leads to measurable improvements in outcomes such as debt-to-GDP ratios and interest rates, we aim to confirm whether the anticipated benefits of ECs—balancing flexibility with fiscal discipline are realized. We adopt the Synthetic Control Method as our primary methodological approach, as it provides a robust framework for estimating the effects of EC activation by constructing a synthetic counterpart that represents the path the country would have followed without activation. This allows for a precise comparison of the actual outcomes post-activation, ensuring that the analysis captures the true effects of ECs within fiscal frameworks.

3 Data and Empirical Strategy

3.1 Low-Frequency Variables

We analyze the fiscal implications of EC activation in three countries—Peru, Mexico, and the United Kingdom—that represent diverse fiscal frameworks and economic contexts. Mexico activated its EC during the 2008–2009 GFC and again in 2015 to address fiscal pressures stemming from declining oil revenues. In the United Kingdom, the EC was invoked as part of temporary fiscal adjustments to stabilize the economy during the 2008–2009 financial crisis. In Peru, the EC was legislatively activated in 2009 and 2010 to mitigate fiscal pressures caused by the GFC. Our analysis of debt-to-GDP spans a window of 5 to 8 years before and after the empirical activation of escape clauses, providing insights into their role in balancing short-term fiscal flexibility with long-term macroeconomic stability.

In addition, we incorporate a range of fiscal covariates to contextualize the estimations. These include aggregate measures such as interest expense, current and total expenditure, fiscal revenue, and primary balance, all expressed as percentages of GDP. These variables allow us to capture patterns of government spending and revenue, shedding light on the fiscal environment in which EC activations occur. For external finances, we use variables such as trade openness (exports plus imports as a percentage of GDP), international reserves (both as a percentage of GDP and relative to capital account positions), and net foreign direct investment, all of which reflect the external economic environment and its interaction with fiscal policies during periods of economic stress.

To assess financing resilience, we include interest payments as a share of fiscal revenue, emphasizing the cost of debt servicing relative to government income. We also account for governance indicators—government effectiveness, regulatory quality, control of corruption, and rule of law—which are critical for evaluating the role of institutional quality in shaping fiscal outcomes. Additionally, broader economic and social conditions are captured through variables such as the inflation rate, per capita real consumption, internal rate of return, broad money supply, and unemployment rate.

We source these variables from authoritative databases, including the World Economic Outlook (WEO), Worldwide Governance Indicators (WGI), and Penn World Table (PWT), among others, ensuring reliability and cross-country comparability. A detailed list of variables and their sources is provided in the Appendix A, offering transparency and clarity in the construction of our dataset.

The descriptive statistics for the period preceding the activation of ECs provide an overview of fiscal, financial, and governance variables across Mexico, Peru, and the United Kingdom, as summarized in Table 1. These metrics capture the economic environments and fiscal conditions that influenced the activation of escape clauses in each country.

The gross debt-to-GDP ratio stands at 41% for Mexico, 45% for Peru, and 36% for the United Kingdom, reflecting varying levels of fiscal indebtedness across these contexts. Regarding aggregate fiscal balance, interest expenses as a percentage of GDP are 3% for Mexico, 2% for Peru, and 1% for the United Kingdom. Current expenditures account for 15% of GDP in Mexico, 16% in Peru, and 36% in the United Kingdom, while total expenditures reach 21% in Mexico, 20% in Peru, and 36% in the United Kingdom. Fiscal revenues correspond to 19% of GDP in both Mexico and Peru, and 35% in the United Kingdom. The primary balance, as a percentage of GDP, is 0.01% for Mexico and Peru, while the United Kingdom exhibits a slightly negative value of −0.001%.

For external finances, trade openness, defined as exports plus imports as a percentage of GDP, is 51% for Mexico, 39% for Peru, and 52% for the United Kingdom. International reserves as a share of GDP are 7% for Mexico, 18% for Peru, and 3% for the United Kingdom. Total international reserves as a percentage of capital account positions are 26% for Mexico, 80% for Peru, and 7% for the United Kingdom. Net foreign direct investment (FDI) flows, expressed as a percentage of GDP, are −0.15% for Mexico, −0.21% for Peru, and 0.28% for the United Kingdom. In the presentation of SCM results for debt, more detailed descriptive statistics are provided for the selected donor countries based on clustering.

Table 1: Mean for treated countries in low frequency

Category	**Variable**	**Mex**	**Per**	**UK**
Dependent Variable	Gross Debt (% GDP)	0.41	0.45	0.36
Aggregate Balance	Interest Expense (% GDP)	0.03	0.02	0.01
	Current Expenditure (% GDP)	0.15	0.16	0.36
	Total Expenditure (% GDP)	0.21	0.20	0.36
	Fiscal Revenue (% GDP)	0.19	0.19	0.35
	Primary Balance (% GDP)	0.01	0.01	-0.00
External Finances	Trade Openness: Exports + Imports (% GDP)	0.51	0.39	0.52
	International Reserves (% GDP)	0.07	0.18	0.03
	Total International Reserves (% CAP)	0.26	0.80	0.07
	Net foreign direct investment (% GDP)	-0.15	-0.21	0.28
Financing Resilience	Interest Payments (% Fiscal Revenue)	0.17	0.12	0.04
Governance	Government Effectiveness (WGI)	0.19	-0.36	1.83
	Control of Corruption (WGI)	-0.23	-0.29	2.03
	Regulatory Quality (WGI)	0.20	0.20	0.20
	Political Stability and Absence of Violence (WGI)	0.10	0.10	0.10
	Voice and Accountability (WGI)	0.25	0.25	0.25
	Rule of Law (WGI)	0.10	0.10	0.10
Natural Resources	Commodity dependence	0.13	0.13	0.11
Real Variables & Prices	Inflation Rate (%)	0.06	0.02	0.01
	Per Capita Real Consumption in PPP	12160	4623	30152
	Real internal rate of return (%)	0.13	0.17	0.10
	Broad Money Supply (% GDP)	0.26	0.12	1.93
	Unemployment Rate (%)	0.03	0.09	0.05

3.2 High-frequency variables

The analysis of high-frequency variables focuses on the EMBI and CDS, both measured on a daily basis. These indicators provide critical insights into sovereign risk dynamics and market perceptions, particularly during periods when ECs in fiscal frameworks are activated. Given the high-frequency nature of the data, no additional control variables are included, allowing the analysis to center exclusively on the sovereign risk metrics provided by these indicators.

The EMBI measures the spread between the yields of sovereign bonds issued by emerging markets and U.S. Treasury bonds, capturing the additional risk perceived by investors when holding emerging market debt. Higher EMBI values indicate greater sovereign risk. CDS, on the other hand, are financial derivatives that serve as insurance against the default of a sovereign bond. The cost of a CDS, expressed in basis points, reflects the market's perception of a country's likelihood of default, with higher CDS spreads signifying increased perceived credit risk.

This analysis includes six countries that activated their ECs at different moments: Brazil on May 27, 2020; Honduras on April 2, 2021; Paraguay on April 20, 2020; Colombia on June 15, 2020; Perú on April 12, 2020; and India on May 17, 2020. These activation dates define the scope for assessing how sovereign risk, as captured by EMBI and CDS, evolved in these nations during periods of heightened economic stress.

The descriptive statistics reveal distinct trends across the analyzed countries (see Table 2). Among those with available EMBI data, Paraguay exhibits the highest value at 3.7, followed closely by Brazil at 3.6, indicating a higher perceived sovereign risk for these countries compared to Colombia, which has an EMBI value of 2.8. These figures reflect the cost of borrowing for these economies in international markets, where higher EMBI values correspond to greater challenges in securing favorable financing terms.

CDS data further underscore variations in market perceptions of default risk. Colombia reports the highest CDS spread at 193.3 basis points, reflecting a relatively elevated perception of sovereign credit risk. In contrast, India and Perú demonstrate lower CDS spreads of 111.2 and 114.4 basis points, respectively, indicating comparatively lower perceived credit risks in these economies. The standard deviations further highlight the disparities, with Colombia experiencing significantly higher variability in its CDS spreads, which underscores the stronger market reactions to shocks compared to the relatively stable perceptions of India and Perú.

Table 2: CDS and EMBI mean for treated countries

Variable	**Country**	**Mean**	**Min**	**Max**	**Std**
EMBI	Brazil	2.8	1.9	4.8	0.5
	Colombia	2.8	1.6	5.2	0.9
	Paraguay	2.5	2.0	5.1	0.5
	Honduras	4.1	2.2	9.2	1.8
CDS	Colombia	160.4	68.3	392.9	73.7
	Peru	83.6	40.1	175.6	28.3
	India	54.5	36.0	134.6	16.1

Note: The table summarizes descriptive statistics for EMBI and CDS data across treated countries. All countries report 1,461 daily observations, covering the period from 2019 to 2022, which includes pre-pandemic, pandemic, and post-pandemic phases.

3.3 Synthetic Control Method

The Synthetic Control Method (SCM), introduced by Abadie and Gardeazabal (2003); Abadie et al. (2010), addresses counterfactual questions in observational studies involving a single treated unit and a set of control units. The primary challenge in such settings lies in identifying an appropriate comparison unit that shares relevant pre-treatment characteristics with the treated unit. In many cases, selecting a single control unit that sufficiently approximates the treated unit is infeasible.

SCM offers a data-driven solution by constructing a weighted combination of multiple control units to create a "synthetic" control unit. This synthetic unit provides a better comparison for the treated unit than any single control unit by closely matching the pre-intervention characteristics of the treated unit. The method ensures a robust counterfactual by leveraging the combined characteristics of multiple control units to approximate the trajectory of the treated unit in the absence of treatment.

In our analysis, we employ SCM to construct synthetic units for both low-frequency and high-frequency variables. These variables include the debt-to-GDP ratio and financial market indicators, such as the EMBI and CDS. The synthetic unit serves as the counterfactual, representing what would have been observed if the ECs had not been activated. This approach allows us to estimate the causal effect of EC activation by comparing actual outcomes with synthetic counterparts. By analyzing both macroeconomic (low-frequency) and financial (high-frequency) indicators, we provide a comprehensive view of the impact of EC activation on fiscal and market stability.

Unlike traditional methods, such as difference-in-differences (DiD), which rely on simple averages of control units, SCM assigns optimal weights to control units based on their similarity to the treated unit (Athey and Imbens (2017)). This feature makes SCM particularly effective in cases with limited control units or unique characteristics in the treated unit that are unmatched by any single control unit.

We conduct two distinct SCM exercises. The first focuses on a low-frequency variable—debt-to-GDP—for three countries that activated their ECs during the GFC: Mexico, Peru, and the United Kingdom. For this exercise, we estimate the trajectory of debt-to-GDP that would have been observed if the ECs had not been activated. The second exercise examines high-frequency variables—EMBI and CDS—for a set of countries that activated their ECs in response to the COVID-19 pandemic. Here, we estimate market reactions by modeling the trajectories of EMBI and CDS under the assumption that ECs were not invoked. Both exercises also explore the broader economic context and the incentives that led to EC activation. While we acknowledge that post-treatment differences could be influenced by unforeseen events or shocks, SCM mitigates these concerns by ensuring that observed effects are not attributable to random factors or endogeneity related to the year of the shock, the treated country, or the control group.

The SCM constructs synthetic units using a weighted average of potential control units (the donor pool). The weights are selected to ensure that the synthetic control matches the pre-treatment characteristics of the outcome variable of interest (e.g., debt-to-GDP, EMBI or CDS) as closely as possible. The countries and weights used to construct each synthetic counterpart are detailed in Appendix B. For this analysis, the treatment is defined as the activation of the EC in year T_0, and the observed outcome variable is represented as Y_{it}. We consider a set of countries $i = 1, \ldots, J+1$ and periods $t = 1, \ldots, T$, where the treated country i activates its EC at $T_0 \in (1, T)$, while the remaining J countries serve as potential controls. The observed outcome for country i at time t is:

$$Y_{it} = \begin{cases} Y_{it}^{NEC} & \text{if the EC was not activated} \\ Y_{it}^{EC} \equiv Y_{it}^{NEC} + \alpha_{it} S_{it} & \text{if the EC was activated} \end{cases} \tag{1}$$

and

$$S_{it} = \begin{cases} 1 & \text{if } t > T_0 \text{ and } i = 1 \\ 0 & \text{otherwise} \end{cases}$$

Here, Y_{it}^{NEC} represents the outcome for country i in the absence of EC activation, while Y_{it}^{EC} denotes the observable outcome when the EC is activated. The binary indicator S_{it} identifies whether the EC was activated ($S_{it} = 1$) or not ($S_{it} = 0$), with $i = 1$ representing the treated country. The parameter α_{it} captures the effect of the EC for country i at time t. Under this framework, country i is treated from period $T_0 + 1$ to T, and the treatment effect is defined as $\alpha_{it} = Y_{it}^{EC} - Y_{it}^{NEC}$. For the treated country, Y_{it}^{EC} is observed, and the primary task is to estimate the counterfactual Y_{it}^{NEC}—i.e., the level of debt-to-GDP or EMBI that would have been observed had the EC not been activated.

The SCM calculates a weighted average of the control units in the donor pool that best approximates the treated unit's pre-treatment trajectory. The intuition behind this method is that combining several untreated units provides a more accurate approximation of the treated unit than relying on any single control unit. Using a vector of weights $W = (w_2, \ldots, w_{n+1})$, the synthetic country estimators for Y_{it}^{NEC} and the treatment effect $\alpha_{1,t}$ are defined as follows:

$$\hat{Y}1, t^{NEC} = \sum i = 2^{i+1} w_i Y_{i,t}^{EC} \tag{2}$$

and

$$\hat{\alpha}1, t = Y1, t^{EC} - Y_{1,t}^{NEC} \tag{3}$$

3.3.1 Inference and Goodness of Fit in Synthetic Control Analysis

To assess the quality of the synthetic control as a valid counterfactual and its ability to mimic the treated country before treatment, Abadie et al. (2010) propose minimizing the distance between the treated unit and its synthetic counterpart. This is achieved through a placebo-based approach to compute confidence intervals. In this method, the treatment is re-assigned to control units in each iteration (placebo tests), treating each control unit as if it had activated its EC. For each control unit $i \neq 1$, we compute the ratio of the root mean squared prediction errors (RMSPE) as follows:

$$RMSPE_i = \frac{\sum_{t=T_0+1}^{T} (Y_{i,t} - Y_{i,t}^{NEC})^2 / (T - T_0)}{\sum_{t=1}^{T_0} (Y_{i,t} - Y_{i,t}^{NEC})^2 / T_0} \tag{4}$$

Here, T_0 represents the treatment period, and T is the total number of time periods. The $RMSPE$ ratio compares the post-treatment squared prediction errors to the pre-treatment squared prediction errors. This ratio ensures that control units with poor pre-treatment fit are not discarded from the analysis.

Confidence intervals are computed by inverting the test statistic for $RMSPE_i$. We evaluate the goodness of fit by comparing the pre-treatment RMSPE to the RMSPE obtained from a model with zero fit. A ratio of $RMSPE_i = 0$ indicates a perfect fit, while a ratio of $RMSPE_i = 1$ suggests that the model performs no better than the baseline with no predictive power. This approach ensures a robust assessment of the synthetic control's ability to replicate the treated unit's pre-treatment trajectory and provide a reliable counterfactual.

3.4 Systematic Selection of Donor Pools through Clustering

A common critique of the SCM is the discretionary selection of the donor pool, as noted by Doudchenko and Imbens (2016). The subjective choice of control units can introduce bias, potentially undermining the validity of the synthetic control and making the analysis sensitive to small changes in the donor pool composition. Addressing this limitation is essential for ensuring the robustness and reliability of SCM estimations.

To mitigate this concern, we implement a data-driven approach to donor pool selection using clustering algorithms. By applying advanced clustering techniques—such as Hierarchical, Spectral, BIRCH, and K-Means—we systematically identify donor countries that share the most relevant structural characteristics with the treated unit (see Table 4 in Appendix A). This method leverages a dataset of 188 potential donor countries, refining the donor pool to those with similar economic and financial profiles. The resulting clusters provide an objective basis for selecting control units, enhancing the robustness and precision of our synthetic control estimates.

The clustering process involves sequentially applying clustering algorithms to group countries based on shared structural characteristics. Starting with the full set of potential donor countries, the clusters are refined iteratively, with the treated country's cluster identified at each stage. This process continues until the number of countries in the treated country's cluster is reduced to 20 or fewer, ensuring that the donor pool remains manageable while retaining high structural comparability.

Importantly, only countries that have implemented a fiscal rule are included in the clustering process. This criterion ensures that selected clusters not only share economic and financial similarities but also operate within comparable fiscal frameworks. By incorporating this constraint, we ensure that the control group is both relevant and well-suited for evaluating the impact of escape clause activation. This systematic approach strengthens the validity of the SCM and addresses a key methodological critique, providing a rigorous foundation for the analysis.

3.4.1 Clustering Algorithms for Donor Pool Selection

To ensure robust and objective donor pool selection in the SCM, we apply four clustering algorithms: Hierarchical Clustering (Ward Method), Spectral Clustering, BIRCH, and K-Means. These methods systematically group countries based on structural and economic similarities, reducing the risk of subjective selection and improving the reliability of SCM estimations. The detailed clustering results for each country and method are provided in Appendix C.

4 Results

This section presents the results of the SCM analysis conducted on both low- and high-frequency variables—debt-to-GDP for the former and EMBI and CDS for the latter—to assess the impact of EC activation. For each variable, we examine the trajectories of debt-to-GDP, EMBI, and CDS as they might have evolved in the absence of EC activation, with each analysis tailored to the specific nature of the variable and the economic context of the EC activation. Given that EC activations were concentrated during significant fiscal stress periods, namely the GFC and the COVID-19 pandemic, we selected countries based on their documented EC activations, focusing specifically on cases within national fiscal rule frameworks.

We applied SCM to three countries—Mexico, Peru, and the United Kingdom—for the debt-to-GDP analysis, a low-frequency variable. Our methodological approach involved four primary steps: selecting treated countries, identifying relevant covariates, refining control groups using clustering algorithms (Hierarchical, Spectral, BIRCH, and K-Means)[3], and executing SCM to visualize counterfactual trajectories. The selected covariates, while not direct determinants of debt-to-GDP, were closely related economic variables that helped sort comparable countries and thus build a more robust counterfactual. The clustering analysis confirmed that results are robust to variations in the control group composition, shock year, and treated country, underscoring the reliability of our findings.

The analysis reveals a positive and significant effect on emerging economies, such as Mexico and Peru. In contrast, the effect is negative but not statistically significant for high-income economies, specifically the United Kingdom. In other words, the observed trajectory of debt-to-GDP was lower when the EC was activated compared to the estimated trajectory without activation. Table 3 summarizes the main results for each country, including key statistics related to Root Mean Squared Prediction Error (RMSPE), which is commonly used across all countries to assess SCM performance.

[3]The clustering approach addresses a key criticism of SCM: the subjective selection of donor pools. By leveraging clustering algorithms, we ensure that the control units selected for the synthetic control share relevant structural and economic characteristics with the treated unit. This systematic selection process enhances the robustness and credibility of the results, reducing the potential for bias caused by arbitrary donor pool selection.

Table 3: SCM estimates of the impact of the activation of escape clauses on debt-to-GDP

Estimation Statistics	Status	Mexico	Peru	United Kingdom
RMSPE-pre	Treated	0.02	0.02	0.02
	Controls	0.11	0.09	0.03
RMSPE-post	Treated	0.07	0.1	0.16
	Controls	0.1	0.16	0.15
Post/Pre-RMSPE	Treated	3.73	4.85	5.92
	Controls	1.37	1.94	6.85
Rank	Treated	13/14	13/14	6/15

Note: RMSPE refers to root mean square prediction error; post/pre-RMSPE ratio rank is the position where the country is located with respect to the donor countries (the lowest, the better).

For estimation statistics, we focus on RMSPE to measure how effectively SCM replicates the treated country's behavior. Specifically, the pre-intervention RMSPE (RMSPE-pre), which indicates the fit quality before the intervention, is relatively low for both treated and control countries, with treated units consistently showing smaller RMSPE values. This lower pre-intervention RMSPE suggests a reliable post-treatment effect, as minimizing the difference between the treated unit and its synthetic counterpart before intervention enhances the method's reliability in the post-treatment period. Our objective is, therefore, for the treated unit's RMSPE to be the smallest relative to those in the donor pool, while the post-treatment period RMSPE (RMSPE-post) should be the largest to indicate a significant treatment effect.

By examining the distribution of the post/pre-intervention RMSPE ratio (Post/Pre), we expect the treated unit to rank among the last positions (Rank). This high ratio may arise due to a very small pre-RMSPE (ensuring an accurate fit before treatment) or a large post-RMSPE, indicating a treatment effect. A large post-RMSPE relative to the control units suggests that the post-treatment trajectory of the treated unit diverges significantly, providing evidence of the effect of EC activation. Ideally, the treated country should rank near the last position in terms of post/pre RMSPE ratio among the donor pool countries (11, 14, 15, or 16 countries, depending on the case).

Table 3 includes RMSPE-pre, RMSPE-post, the Post/Pre ratio, and Rank. While RMSPE-pre shows a good fit across all three countries, the RMSPE-post for the United Kingdom aligns closely with the control group mean, suggesting minimal differences in the post-treatment period and indicating an insignificant effect. The post/pre ranking confirms this interpretation: the ratio is notably higher for Mexico and Peru compared to the controls but remains similar for the United Kingdom. Finally, the rank corroborates these findings; while Mexico and Peru show significant post-treatment divergence and rank near the penultimate position, the United Kingdom ranks closer to the initial positions, indicating minimal divergence.

For high-frequency financial indicators (EMBI and CDS), we focused on past lagged observations instead of a set of covariates to capture the immediate market reactions often triggered by fiscal shocks. This approach is more accurate for analyzing high-frequency responses within market dynamics. For this part of the SCM analysis, we selected treated countries, identified a donor pool to construct counterfactuals, and generated visualizations illustrating counterfactual trends. The results are robust across variations in shock years, control group composition, and treated countries, reinforcing the reliability of the observed impacts.

Table 4 presents estimation statistics for EMBI in Brazil, Colombia, Honduras, and Paraguay, showing the trajectory that EMBI would likely have followed in the absence of EC activation. Table 5 presents estimation statistics for CDS in Colombia, India, and Peru, capturing the hypothetical trajectory without EC activation.

The estimates for EMBI and CDS are qualitatively similar, indicating consistent market responses across both indicators.[4] Specifically, each treated country exhibits a low pre-treatment RMSPE relative to its control group average, demonstrating a good pre-treatment

[4]Both measures are complementary: EMBI data is generally limited to low-income economies, while CDS data expands our analysis to a broader set of countries and provides an alternative view of market perception.

fit. While the post-treatment RMSPE is slightly lower for some treated countries than for the mean of their controls, this is likely due to data frequency and the complexity of market reactions, which reflect various elements of the fiscal framework. The immediate reaction following EC activation is best analyzed through visual inspection, as shown in Figures 4 to 10 for both EMBI and CDS.

Table 4: SCM estimates of the impact of the activation of escape clauses on the EMBI

Estimation Statistics	Status	Brazil	Colombia	Honduras	Paraguay
RMSPE-pre	Treated	0.13	0.07	0.07	0.09
	Controls	0.79	0.67	0.72	1.35
RMSPE-post	Treated	0.78	0.18	0.43	0.29
	Controls	1.78	1.42	0.65	1.69
Post/Pre	Treated	6.22	2.55	5.96	3.12
	Controls	3.46	2.65	1.69	2.62
Rank	Treated	12/15	6/15	14/15	10/15

RMSPE refers to root mean square prediction error; post/pre-RMSPE ratio rank is the position where the country is located with respect to the donor countries (the lowest, the better).

The post/pre-intervention RMSPE ratio is consistently highest for treated countries compared to the control average in both cases (e.g. when the control variable is the EMBI or the CDS). Analyzing these estimates and the post/pre RMSPE ratio rank reveals that EC activation was particularly beneficial for Brazil, Honduras, and Paraguay regarding EMBI, with observed EMBI values falling below the counterfactuals. Similarly, for India and Peru, CDS values were lower following EC activation than they would have been otherwise, ranking near the bottom and indicating the effect is unlikely to be incidental. In Colombia's case, the EMBI effect is less pronounced, with a post/pre RMSPE ratio close to the control mean, placing Colombia among the higher ranks. However, when analyzing the CDS, Colombia demonstrates a significant effect with a clear divergence following activation.

Table 5: SCM estimates of the impact of the activation of escape clauses on CDS

Estimation Statistics	Status	Colombia	India	Peru
RMSPE-Pre	Treated	2.52	5.38	6.49
	Controls	8.79	29.02	24.48
RMSPE-Post	Treated	6.23	11.99	15.94
	Controls	8.28	38.66	19.93
Post/Pre	Treated	2.47	2.23	2.45
	Controls	1.16	1.27	1.02
Rank	Treated	10/11	12/16	10/11

RMSPE refers to root mean square prediction error; post/pre-RMSPE ratio rank is the position where the country is located with respect to the donor countries (the lowest, the better).

The visual representations, discussed in detail in the next section, confirm these distinctions in post-treatment trajectories. For Colombia, the EMBI comovement aligns closely with the observed trend and shows no significant difference (see Appendix D). Conversely, the CDS trajectory indicates a notable immediate effect following EC activation, with a temporary divergence that later closes, highlighting market sensitivity to EC activation. This suggests that markets can respond distinctly across indicators, with the CDS showing a significant reaction in Colombia's case.

In the following, we present the debt-to-GDP trajectories for three countries—Mexico, Peru, and the United Kingdom—examining the distinct contexts in which their ECs were activated. These cases highlight differences between two emerging economies and one advanced economy, showcasing the varying fiscal frameworks and economic pressures under which escape clauses were employed. For high-frequency variables, such as the EMBI and CDS, we focus on quantifying the fiscal savings associated with escape clause activation rather than visualizing each trajectory. Given the potential repetitiveness of trajectory analyses, detailed results for these indicators are included in the appendix.

4.1 Escape clauses and counter-factual analysis: debt-to-GDP

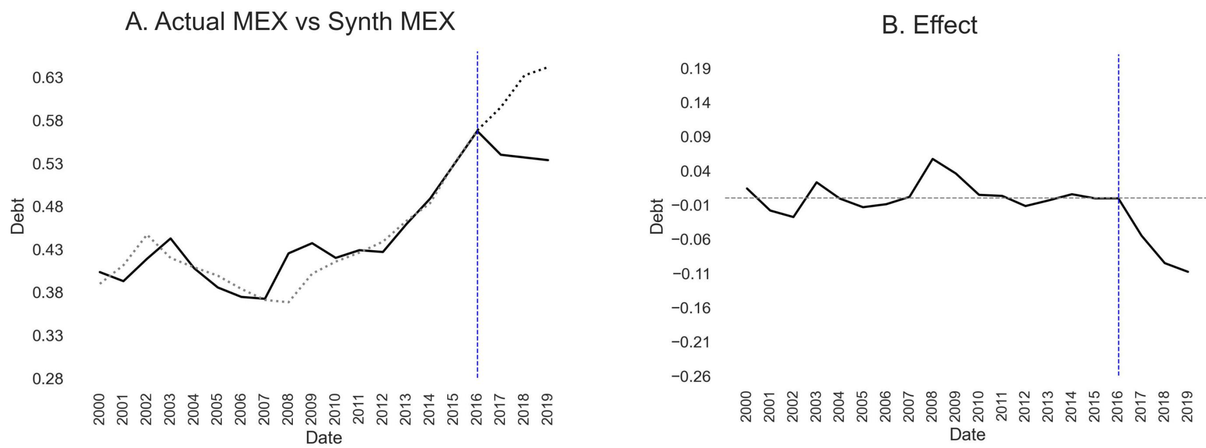
The activation of escape clauses across countries reveals varied outcomes shaped by the specific design and institutional context of each fiscal framework. While their effectiveness in mitigating fiscal pressures and reducing debt levels is evident in some cases, the degree of success depends on the strength of the supporting institutional arrangements and the coherence of the fiscal framework.

This heterogeneity underscores the need to tailor ECs to each country's economic and institutional context. Flexibility to respond to shocks must be complemented by clear activation criteria, credible mechanisms for returning to fiscal targets, and robust institutional support. Ultimately, the effectiveness of escape clauses lies in their integration into a country's broader fiscal governance system, balancing immediate needs with long-term sustainability.

4.1.1 Mexico

The results of our SCM analysis underscore the effectiveness of Mexico's EC within its fiscal framework. As depicted in Figure 1, the observed debt-to-GDP trajectory diverged markedly from the counterfactual beginning in 2016, with the actual debt-to-GDP consistently lower than what would have occurred without the escape clause activation. This divergence highlights the escape clause's critical role in providing fiscal flexibility during a period of economic turbulence, enabling Mexico to manage the severe revenue shock caused by declining oil prices. The strong alignment between observed and counterfactual trajectories in the pre-treatment period affirms the robustness of our SCM model and the reliability of the results.

Figure 1: SCM estimates for the EC in Mexico



Interestingly, despite the formal activation of the EC in 2015, no divergence was observed in that year. This lag in visible effects is likely attributable to the recalibration of fiscal policy following the 2014 reform and evolving market expectations regarding the deficit. Fiscal uncertainty peaked in 2016 as risks associated with the oil price shock materialized. Our findings suggest that by permitting temporary deficits, the EC was pivotal in mitigating fiscal pressures, resulting in a more favorable debt-to-GDP trajectory compared to the counterfactual.

These outcomes must be contextualized within Mexico's evolving fiscal framework. The *Ley Federal de Presupuesto y Responsabilidad Hacendaria* (LFPRH) initially operated under a fiscal balance rule, and the EC was first activated during the 2008–2009 Global Financial Crisis. At that time, deficits were allowed under exceptional circumstances, leading to deviations from the expected debt-to-GDP trajectory and contributing to a weaker SCM fit for those years. Persistent deficits between 2011 and 2015, averaging over 2.5% of GDP, heightened fiscal pressures and underscored the need for subsequent policy reforms.

In 2015, Mexico adopted a structural balance rule, introducing limits on the growth of structural current expenditure (*gasto corriente estructural*), calculated relative to potential output. This reform retained the EC's provision for extraordinary deficits but anchored it within a broader framework designed to control expenditure growth. The interplay of these mechanisms during the 2015–2016 period was crucial. The EC enabled deficits to address the revenue shock, while structural expenditure limits curbed excessive debt accumulation. The divergence observed in 2016 reflects this synergy, illustrating how the escape clause and structural limits complemented each other to maintain fiscal discipline while accommodating necessary flexibility.

This interaction is particularly significant. While the EC provided flexibility to absorb revenue shocks, the structural balance rule acted as a stabilizing anchor, ensuring fiscal policy alignment with medium-term sustainability objectives. This dual mechanism enabled Mexico to achieve a debt-to-GDP trajectory consistently lower than the counterfactual, underscoring the complementary roles of these tools in managing fiscal shocks effectively.

Despite these successes, our analysis also highlights limitations in the EC's design. In its current form, the clause relies heavily on legislative approval to justify deficits but lacks detailed plans for returning to fiscal targets. This structural vulnerability could undermine credibility, as the broad scope of the clause allows frequent justification of deficits without ensuring alignment with long-term fiscal objectives. Although the clause's flexibility is valuable for addressing short-term shocks, its potential overuse risks misalignment with sustainability goals.

A key issue is the disconnect between the structural balance rule's focus on controlling expenditure growth and the practical application of the escape clause. While the structural rule limits current expenditure growth relative to potential GDP, the escape clause often operates outside this framework, emphasizing deficit justification through legislative processes. This approach prioritizes validation over proactive fiscal management, revealing the need for refinements to the clause's design.

The implications of our findings are twofold. First, the EC has proven instrumental in alleviating fiscal pressures, enabling Mexico to achieve a more favorable debt-to-GDP ratio than would have been possible without its activation. This highlights the clause's utility as a countercyclical tool during economic stress. Second, the results point to the need for design improvements. Strengthening the EC's alignment with Mexico's structural fiscal rule requires more explicit mechanisms for activation and exit strategies. This would ensure coherence with broader fiscal objectives and bolster credibility.

Overall, while the EC has provided essential fiscal flexibility, its long-term effectiveness depends on its integration within Mexico's overarching fiscal framework. Enhancing this alignment is vital for building external stakeholder confidence and ensuring that the clause serves not only as a temporary measure but as a tool for improving fiscal governance and sustainability.

4.1.2 United Kingdom

Our SCM analysis for the United Kingdom reveals a stark contrast to the cases of Mexico and Peru. As illustrated in Figure 2, the observed debt-to-GDP trajectory was consistently higher than the counterfactual following the activation of the escape clause during the 2008–2009 global financial crisis. This outcome suggests that the escape clause failed to significantly mitigate fiscal pressures, as the divergence between the observed and counterfactual trajectories was not statistically significant. Consequently, the post-treatment effect cannot be directly attributed to the activation of the escape clause, raising critical questions about its effectiveness within the UK's fiscal framework.

Several factors help contextualize this result, particularly the unique institutional characteristics of the UK's fiscal framework during this period. The escape clause was embedded within the Code for Fiscal Stability, designed to provide flexibility during exceptional circumstances. However, the global financial crisis revealed significant challenges in adhering to numerical fiscal objectives under extreme economic uncertainty. In response, the government activated the escape clause in 2008 and 2009, allowing temporary deficits and suspending its fiscal rules. Instead of returning to the original rules, the government adopted new interim fiscal targets for three years. These targets lacked specificity, broadly emphasizing "reducing the deficit and eventually getting debt to fall." This departure from consistent rules undermined the credibility of the fiscal framework and limited the escape clause's stabilizing potential.

Figure 2: SCM estimates for the EC in United Kingdom

Prior to the crisis, the UK's fiscal framework was governed by the Golden Rule and the Sustainable Investment Rule. The Golden Rule required the government to balance the public sector current budget over the economic cycle, permitting borrowing only for capital investment. The Sustainable Investment Rule aimed to keep public sector net debt below 40% of GDP. However, the crisis prompted a departure from these principles. In 2009, a temporary operating rule was introduced, targeting annual improvements in the cyclically adjusted current budget and debt stabilization. While these adjustments provided immediate fiscal flexibility, they lacked clear recovery benchmarks or definitions for when the economy would be considered stable, further eroding the escape clause's effectiveness.

The fiscal outcomes during this period reflected these institutional shortcomings. While the cyclically adjusted current budget improved annually—from a deficit of 4.4% of GDP in 2009–2010 to 2.3% in 2014–2015—public sector net debt continued to rise, peaking at 83.8% of GDP in 2016–2017. These outcomes highlight the limitations of temporary fiscal rules during crises, particularly their inability to address rising debt levels. Although the escape clause allowed for necessary deficits, the absence of clear return mechanisms and shifting fiscal targets diminished its stabilizing role.

The SCM results confirm that the activation of the escape clause did not achieve its intended goal of stabilizing the debt-to-GDP trajectory. While the pre-treatment period shows a reasonable fit between observed and counterfactual trajectories, the post-treatment period reveals a divergence, with the observed debt-to-GDP ratio exceeding the counterfactual. This lack of significance underscores the role of institutional weaknesses in shaping fiscal outcomes, as frequent rule changes and unclear recovery paths undermined the escape clause's effectiveness.

The UK's experience underscores the critical importance of institutional credibility in the design and implementation of escape clauses. While the clause provided short-term flexibility during the crisis, its effectiveness was undermined by inconsistent fiscal rules and the absence of a clear path to pre-crisis objectives. Unlike cases where escape clauses facilitated more favorable fiscal outcomes, the UK's case illustrates how weak institutional commitments can constrain their potential benefits.

The broader lesson from the UK's experience is that escape clauses must balance flexibility with accountability to be effective tools in fiscal frameworks. Clear activation criteria, well-defined recovery paths, and consistent fiscal rules are essential for maintaining credibility and ensuring that escape clauses strengthen fiscal discipline. The lack of such mechanisms in the UK contributed to persistent debt accumulation, with public sector net debt continuing to rise long after the crisis period.

Although the SCM results indicate that the UK's escape clause fell short of its objectives during the 2008–2009 crisis, this case provides valuable insights for the design and implementation of fiscal rules. By aligning escape clause activations with robust institutional commitments, governments can better navigate economic shocks while safeguarding fiscal sustainability over the long term.

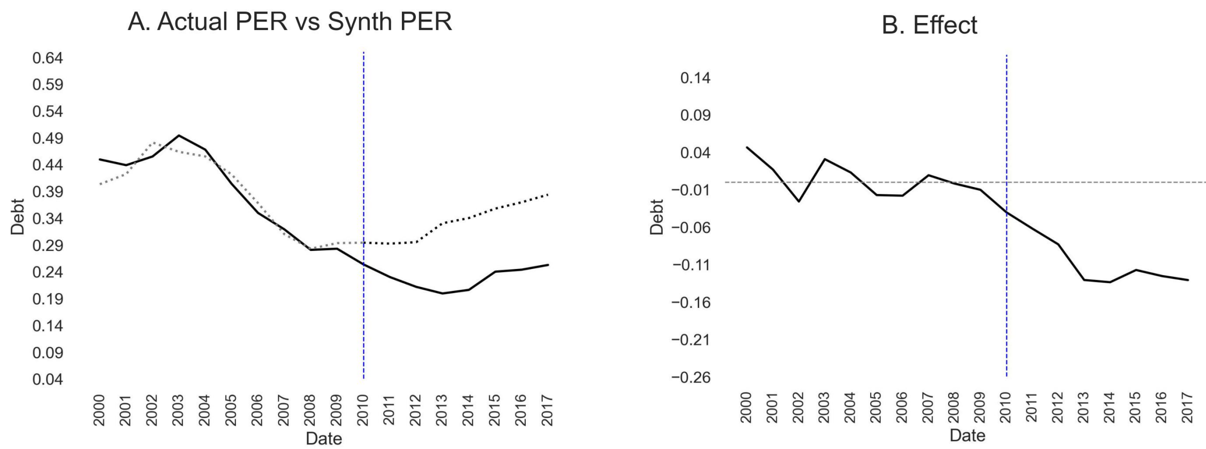
4.1.3 Peru

The SCM results for Peru reveal a significant divergence in debt-to-GDP trajectories starting in 2010, corresponding with the activation of its escape clause through Law 29368. As illustrated in Figure 3, the observed debt-to-GDP ratio remained consistently below the counterfactual, indicating that fiscal rule modifications mitigated the potential rise in debt during the global financial crisis. The pre-treatment period exhibits a strong alignment between the observed and counterfactual trajectories, validating the robustness of the SCM model in capturing Peru's fiscal dynamics. The post-treatment divergence underscores the role of fiscal adjustments in providing temporary flexibility while maintaining an overarching commitment to discipline.

Unlike a full suspension of fiscal rules, Peru's escape clause activation reflected a legislative adjustment rather than a strict procedural adherence to the original Fiscal Responsibility Law. While the formal escape clause provisions envisioned a detailed return-to-target framework, the government opted for a temporary modification of fiscal rules under Law 29368. This approach enabled flexibility in fiscal targets without outright abandoning the legal framework of the original fiscal rule. The SCM results highlight how these modifications allowed Peru to address immediate economic challenges while maintaining a framework of accountability and respect for its institutional principles.

The legislative modification provided a degree of transparency and collective oversight that full suspensions often lack. Deviations from the modified targets were relatively minor, which likely supported a smoother transition back to fiscal discipline after the crisis. Notably, Peru introduced a debt rule in 2016, further anchoring its fiscal policy and ensuring a more stable trajectory in subsequent years. However, the absence of strict procedural compliance with the original escape clause provisions raises important questions. While the legislative adjustments effectively addressed immediate needs, they also revealed gaps in procedural rigor, particularly in defining activation criteria and establishing clear return-to-target mechanisms.

Figure 3: SCM estimates for the EC in Peru



Peru's fiscal framework has evolved gradually, reflecting an ongoing effort to balance flexibility with discipline. The introduction of the debt rule represents a pivotal shift, providing a robust anchor for fiscal policy and enhancing macroeconomic stability. However, the experience during the global financial crisis highlights trade-offs associated with bypassing procedural requirements for escape clause activation. While legislative adjustments allowed for nimble responses to economic shocks, the lack of a clearly articulated return-to-target plan risked undermining the credibility and predictability of Peru's fiscal framework.

The SCM results underscore both the strengths and limitations of Peru's approach. The observed debt-to-GDP trajectory demonstrates the effectiveness of legislative modifications in limiting debt accumulation relative to the counterfactual. Yet, the absence of procedural alignment with the original escape clause design highlights vulnerabilities in ensuring consistent and transparent fiscal adjustments. These findings suggest that while Peru's legislative approach was effective in addressing short-term challenges, aligning such modifications more closely with formal escape clause provisions could further enhance their credibility and transparency.

When contrasted with Mexico and the United Kingdom, Peru presents a unique trajectory of fiscal rule adaptation and outcomes. Mexico's escape clause was instrumental in navigating both reform and economic shocks, yielding positive effects on debt-to-GDP dynamics. In contrast, the United Kingdom's experience revealed limited effectiveness due to institutional weaknesses and shifting fiscal targets. Peru's case falls between these two extremes. The legislative activation of its escape clause during the global financial crisis enabled necessary fiscal adjustments without abandoning its broader framework, eventually supporting a return to fiscal discipline through the 2016 debt rule. This trajectory underscores the interplay between short-term flexibility and long-term fiscal sustainability.

The Peruvian experience offers important lessons for designing and implementing escape clauses. Procedural clarity and alignment with broader fiscal frameworks are essential to enhancing both the credibility and sustainability of fiscal adjustments. Strengthening activation criteria, return-to-target mechanisms, and institutional transparency can ensure that escape clauses serve not only as tools for temporary flexibility but also as pillars of effective fiscal governance in the aftermath of economic shocks.

4.2 Escape Clauses and Counterfactual Analysis: EMBI and CDS

The COVID-19 pandemic introduced a new period of fiscal stress, prompting several countries to activate their ECs to manage unprecedented economic challenges. This section evaluates the impact of these activations on high-frequency financial variables, specifically the EMBI and CDS. By analyzing immediate market reactions, we assess how fiscal flexibility influenced sovereign risk perceptions during this period of heightened uncertainty. Consistent with the findings from low-frequency variables, the SCM results demonstrate that the observed trajectories of EMBI and CDS were systematically lower than their counterfactuals during EC activation. These results suggest that countries employing ECs effectively mitigated market concerns, benefiting from improved sovereign risk profiles.

The observed patterns highlight the signaling value of EC activation. By activating escape clauses during the pandemic, governments conveyed a clear commitment to addressing fiscal shocks within a defined institutional framework. This transparency likely reassured investors and market participants, reducing perceptions of sovereign risk. ECs provided a formal mechanism for mobilizing resources to address fiscal and economic disruptions. Appendix D presents detailed SCM results for Peru, India, Colombia, Brazil, Honduras, and Paraguay—countries selected based on data availability. A synthesis of these findings reveals that EC activation elicited favorable market responses, leading to tangible fiscal savings through reduced borrowing costs.

To quantify the financial benefits of these reduced spreads, we estimated the relationship between EMBI and CDS changes and interest payments (%GDP) using the model specified in Equation 5:

$$Interest_{it} = \phi_i + \mu_t + \beta X_{it} + \epsilon_{it} \tag{5}$$

where $Interest_{it}$ represents interest payments as a share of GDP for country i at time t, ϕ_i denotes country fixed effects, μ_t captures time fixed effects, $X_{i,t}$ represents the high-frequency variable (EMBI or CDS), β measures the relationship between $X_{i,t}$ and interest payments, and $\epsilon_{i,t}$ is the error term. In other words, β captures how the savings in terms of basis points (bp) of EMBI or CDS could translate to percentage points (pp) of interest. In this case, we take the annual average of EMBI and CDS to relate them to interest. It is important to mention that these estimations do not intend to be causal but rather an intuitive way to provide an order of magnitude of high-frequency risk indicators in terms of annual and familiar variables such as interest payments.

Table 6: Relationship between high-frequency variables and interests (%GDP)

Variable	**Activation**	**Country**	β **(bp to pp)**	**Average Effect (bp)**	**Active (days)**	**Average effect (pp)**	**Average interest (% GDP)**	**Effect over mean (pp)**
	(1)	(2)	(3)	(4)	(5)	(6) = (3) x (4)	(7)	(8) = (6)/(7)
CDS	2020	IND	0.05	-22.3	360	-1.2	5.1	-23.0
	2020	PER	0.05	-6.3	90	-0.3	1.4	-23.3
	2020	COL	0.05	-0.3	60	0.0	3.1	-0.5
EMBI	2020	BRA	0.27	-0.85	51	-0.24	5.4	-4.4
	2020	COL	0.27	-0.21	54	-0.06	3.1	-1.8
	2021	HND	0.27	-0.46	122	-0.13	1.0	-12.4
	2020	PRY	0.27	0.01	41	0.00	1.4	0.2

Table 6 summarizes the β coefficients, which reflect the sensitivity of interest payments to changes in the EMBI and CDS spreads, alongside the average effects of EC activation.

The first and second columns of the table represent the country and the year of activation, respectively. The third columns show the β coefficients for CDS and EMBI. In the case of CDS, the estimation indicates that for each 1 bp change in the CDS, there is an equivalence of 0.05 pp in interest payments as a percentage of GDP. On the other hand, for the EMBI, a 1 bp change results in an equivalence of -0.27 pp in interest payments.

For EMBI in India, the average effect (column 4) is -22.3 bp, and it remains active for approximately 300 days (column 5). When this effect is expressed in terms of pp of interest payments, it corresponds to an equivalence of a reduction of 1.2 pp. Comparing this e—ffect to the average ratio (column 7), we observe an equivalence of a 23% decrease (column 8) relative to the mean.

Across the analyzed countries, fiscal savings ranged from -0.5 to -23.3 percentage points for EMBI and from -12.41 to 0.22 percentage points for CDS.

The SCM findings underscore the financial benefits of EC activation during crises. Reduced EMBI and CDS spreads eased borrowing costs and expanded fiscal space, enabling countries to respond more effectively to economic shocks. These reductions in sovereign risk were sustained for periods ranging from 60 to 360 days, demonstrating the enduring market confidence fostered by EC activation.

Beyond immediate fiscal savings, ECs also contributed to stabilizing fiscal trajectories. Without activation, many countries would likely have faced sharper debt increases, intensifying vulnerabilities and limiting their capacity to address future shocks. By institutionalizing temporary fiscal flexibility, ECs mitigated these risks and supported long-term fiscal sustainability.

These findings emphasize the strategic importance of ECs in modern fiscal governance. However, their effectiveness hinges on well-designed frameworks with clearly defined triggers, transparent activation criteria, and credible commitments to return to fiscal targets.

Improved communication strategies surrounding EC activation can further enhance their market-stabilizing effects, reducing uncertainty and reinforcing trust in fiscal policy. Strengthening these elements can maximize the role of ECs as instruments of both fiscal flexibility and long-term sustainability.

5 Robustness Checks

The robustness of our findings hinges on the SCM's ability to construct credible counterfactuals for treated units. To validate the estimated effects of EC activation, we conducted comprehensive robustness checks, including placebo tests and evaluations of RMSPE ratios. These checks serve to ensure that observed treatment effects are not driven by random variation or biases in donor pool selection, reinforcing the reliability of our results.

Placebo tests reassign the treatment to control units in the donor pool, constructing synthetic controls as if these units had activated an EC. This approach enables comparison of the post-treatment RMSPE for the actual treated country with those for placebo cases. A significantly higher post-treatment RMSPE for the treated country relative to placebo cases indicates that the observed effect is unlikely to result from chance or poor model fit. Confidence intervals for the treatment effect are derived by inverting the RMSPE ratio distribution, providing a quantitative benchmark for the robustness of our findings.

To illustrate the robustness procedures, we focus on Peru's debt-to-GDP trajectory as an example, and the results for all other countries are available upon request. Figure **??** shows Peru's robustness checks. Panel A demonstrates the SCM estimates with cluster-selected donor countries, confirming strong pre-treatment alignment and post-treatment divergence attributable to EC activation. Panel B provides a country placebo test, with Colombia treated as if it activated an EC, showing no significant divergence post-treatment. Panels C and D simulate time-placebo tests, assuming EC activation occurred earlier or later, with no divergence observed in these counterfactual scenarios. These results underscore the causal interpretation of the observed effects in Peru and demonstrate the methodological rigor of our approach.

To synthesize the findings from both low- and high-frequency analyses, we summarize the results for all treated countries across the variables of interest in the following tables. These summaries include key metrics such as the Root Mean Squared Prediction Error (RMPSE) and its ranking, as well as the outcomes of robustness checks, including cluster-based donor selection, country-level placebo tests, and time-based placebos. Together, these tables provide a comprehensive overview of the SCM results, highlighting the reliability and significance of escape clause activation effects on debt-to-GDP trajectories, EMBI spreads, and CDS spreads across the selected countries.

The panel B of Table 7 summarizes the results for the debt-to-GDP analysis across the three treated countries: Mexico, Peru, and the United Kingdom. For Mexico and Peru, the Synthetic Control Method (SCM) produced a strong pre-treatment fit, with both countries achieving an RMPSE ranking of 13/14. The results for these countries proved robust to cluster donor selection and country-level placebo tests, though each exhibited some sensitivity to time-placebo tests, with Mexico showing limitations post-treatment and Peru pre-treatment. In contrast, the United Kingdom displayed a weaker fit, with an RMPSE ranking of 6/15. While the UK results passed country and time-placebo tests, they did not hold under cluster donor tests, reflecting challenges in selecting comparable control units. These findings highlight the methodological rigor of the SCM approach while emphasizing the importance of adapting the framework to different fiscal contexts and institutional designs.

Table 7: Summary of Descriptive Results and Robustness Checks for Treated Countries

	Inference		**Placebos**			
	RMPSE	**RMPSE ranking**	**Cluster donors**	**Country**	**Before**	**After**
Panel A. Debt						
Mexico	✓	13/14	✓	✓	✓	✓
Peru	✓	13/14	✓	✓	✓	✓
United Kingdom	×	6/15	✓	×	✓	✓
Panel B. EMBI						
Brazil	✓	12/15		✓	✓	✓
Colombia	×	6/15		✓	✓	✓
Honduras	✓	14/15		✓	✓	✓
Paraguay	✓	10/15		✓	✓	✓
Panel C. CDS						
Colombia	✓	10/11		✓	✓	✓
India	✓	12/16		✓	✓	✓
Peru	✓	10/11		✓	✓	✓

The panel B of Table 7 summarizes the robustness checks conducted for the EMBI analysis across Brazil, Colombia, Honduras, and Paraguay. The Root Mean Squared Prediction Error (RMPSE) rankings indicate the fit of the Synthetic Control Method (SCM) for each country. Brazil demonstrates a strong fit, with an RMPSE ranking of 12/15, supported by positive results across all placebo tests, including country-level and time-based pre- and post-treatment evaluations. Honduras exhibits the highest level of robustness with an RMPSE ranking of 14/15, validating the SCM model's reliability. Paraguay also shows robust results, with an RMPSE ranking of 10/15, passing all placebo tests despite slightly lower precision compared to other countries. Colombia, in contrast, has a weaker RMPSE ranking of 6/15, raising some concerns about the pre-treatment fit; however, the placebo tests confirm the validity of the results, providing confidence in the causal interpretation of EMBI trajectories following escape clause activation.

Finlally, the Panel C of Table 7 presents the robustness results for the CDS (Credit Default Swaps) analysis in Colombia, India, and Peru. Across all three countries, the SCM model performs robustly, passing all placebo tests, including country-specific and time-based pre- and post-treatment analyses. Colombia and Peru exhibit excellent pre-treatment fits, with RMPSE rankings of 10/11, demonstrating strong alignment between observed and counterfactual trajectories prior to escape clause activation. India shows a slightly lower RMPSE ranking of 12/16, reflecting moderate precision in the counterfactual estimation, but the robustness checks confirm the reliability of the SCM results. These findings underscore the consistency of the escape clause's impact on sovereign risk as measured by CDS spreads across diverse economic contexts.

6 Conclusions and Policy Implications

Our analysis underscores the critical role of ECs in navigating fiscal challenges during periods of economic stress. For low-frequency variables, the results demonstrate that ECs provided effective mechanisms to mitigate debt pressures in Mexico and Peru, enabling temporary fiscal flexibility. In Mexico, the integration of structural reforms and the EC created a robust framework, resulting in significant debt-to-GDP reductions. In Peru, legislative modifications also contributed to stabilizing fiscal trajectories, though procedural bypasses raised concerns about consistency and adherence to predefined return paths. In contrast, the United Kingdom's results highlight the limitations of ECs when institutional credibility is undermined by unclear return mechanisms and shifting fiscal targets.

For high-frequency variables, such as EMBI and CDS spreads, EC activation consistently reduced sovereign risk, reflecting immediate market confidence. These reductions translated into tangible fiscal savings through lower borrowing costs, with countries like Brazil and

Honduras experiencing particularly robust effects. Across the analyzed countries, EC activation demonstrated a dual benefit: addressing fiscal constraints while reducing financial risk. While the impacts varied by country, the results highlight the broad utility of ECs as tools for stabilizing financial markets during crises.

The effectiveness of ECs depends on institutional credibility and thoughtful design. Clear activation criteria, transparent governance, and explicit return-to-target strategies are essential for maintaining market confidence and ensuring the sustainability of fiscal frameworks. The experience of Peru illustrates the benefits of flexibility provided by ECs but also underscores the risks associated with bypassing strict procedural requirements, which can undermine long-term credibility. In contrast, the United Kingdom's reliance on loosely defined fiscal targets weakened its framework, emphasizing the need for stable institutional commitments to maximize the effectiveness of ECs.

Our findings reveal that balancing flexibility and discipline is central to the success of ECs. Emerging economies like Mexico and Peru leveraged ECs to stabilize debt trajectories and maintain market access, while advanced economies, exemplified by the United Kingdom, faced greater challenges in aligning EC use with fiscal discipline. These contrasting experiences underscore the importance of tailoring fiscal rule design to the economic and institutional context of each country.

Integrating ECs with clear triggers, governance mechanisms, and exit strategies is crucial for effective fiscal rule design and alignment with broader objectives. The findings highlight ECs as vital tools for countercyclical policy, enhancing resilience and market stability. Effective communication of activation details is essential to reassure markets. As uncertainties persist, robust EC frameworks balance flexibility with long-term sustainability, reinforcing sound fiscal governance.

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Appendices

A Data sources

Figure 4: Variables description and data sources

Category	Variable	Source
Dependent Variable	Gross Debt (% GDP)	The World Economic Outlook (WEO)
Aggregate Balance	Interest Expense (% GDP)	The World Economic Outlook (WEO)
	Current Expenditure (% GDP)	The World Economic Outlook (WEO)
	Total Expenditure (% GDP)	The World Economic Outlook (WEO)
	Fiscal Revenue (% GDP)	The World Economic Outlook (WEO)
	Primary Balance (% GDP)	The World Economic Outlook (WEO)
External Finances	Trade Openness: Exports + Imports (% GDP)	The World Economic Outlook (WEO)
	Total International Reserves (% CAP)	The Government Finance Statistics (GFS)
	International Reserves (% GDP)	The World Bank
	Net foreign direct investment (% GDP)	The External Wealth of Nations Database
Financing Resilience	Interest Payments (% Fiscal Revenue)	WEO and The World Bank
Governance	Regulatory Quality (WGI)	The Worldwide Governance Indicators (WGI)
	Political Stability and Absence of Violence (WGI)	The Worldwide Governance Indicators (WGI)
	Government Effectiveness (WGI)	The Worldwide Governance Indicators (WGI)
	Control of Corruption (WGI)	The Worldwide Governance Indicators (WGI)
	Voice and Accountability (WGI)	The Worldwide Governance Indicators (WGI)
	Rule of Law (WGI)	The Worldwide Governance Indicators (WGI)
Natural Resources	Commodity dependence	The World Economic Outlook (WEO)
Real Variables & Prices	Inflation Rate (%)	The World Economic Outlook (WEO)
	Per Capita Real Consumption in PPP	Penn World Table (PWT)
	Real internal rate of return (%)	Penn World Table (PWT)
	Broad Money Supply (% GDP)	The Government Finance Statistics (GFS)
	Unemployment Rate (%)	International Labour Organization (ILOSTAT)

B Donor Pool Composition

The following tables detail the donor pool countries employed in the Synthetic Control Method analysis. For the low-frequency analysis, donor pools were constructed based on multiple economic, fiscal, and financial variables to ensure structural comparability with the treated units. In contrast, the high-frequency analysis relied on a single variable—sovereign risk indicators such as EMBI or CDS—to generate the synthetic counterparts. The clustering algorithm played a pivotal role in systematically identifying the most suitable donor countries, ensuring robust pre-treatment alignment and reliable counterfactual estimations. These tables highlight the composition of the donor pools, reflecting the methodological precision underpinning the analysis of escape clause activation impacts.

Table 8: Donnor Pool countries, EMBI

Donors	**Brazil**	**Colombia**	**Honduras**	**Paraguay**
Peru	0.16	0.19	0.11	0.16
Chile	0.15	0.17	0.12	0.15
Panama	0.15	0.17	0.11	0.15
Uruguay	0.14	0.17	0.12	0.15
Paraguay	0.11	0.11		
Guatemala	0.10	0.09	0.09	0.10
Honduras	0.07	0.04		
Mexico	0.03		0.05	0.03
Dominican Republic	0.02	0.01	0.05	0.01
El Salvador	0.02	0.01		0.01
Costa Rica		0.01		
Colombia			0.09	0.12
Brazil			0.07	0.10
Argentina			0.04	

Table 9: Donnor Pool countries, CDS

Donors	**Colombia**	**India**	**Peru**
Mexico	0.80		0.11
Guatemala	0.19		
New Zealand	0.00	0.16	
Peru	0.00	0.07	
Lithuania	0.00	0.03	
Ireland	0.00		0.09
Belgium	0.00		
Chile	0.00		
Romania	0.00		
Slovenia	0.00		
Thailand		0.27	
Bulgaria		0.17	
Hong Kong		0.16	
Cyprus		0.03	
Estonia		0.03	
Iceland		0.03	
Latvia		0.03	
Indonesia			0.11
Italy			0.11
Malaysia			0.10
Panama			0.10
Canada			0.09
Denmark			0.09
Philippines			0.09
United Arab Emirates			0.09

Table 10: Donnor Pool countries, Debt-to-GDP

Donors	**Mexico**	**Peru**	**U. Kingdom**
Bahamas (the)	0.38	0.23	
Brazil	0.31	0.00	
Chile	0.16	0.14	
Costa Rica	0.10	0.00	
Jamaica	0.04		
Panama	0.02	0.35	
Ecuador	0.01		
Honduras	0.00	0.15	
Argentina	0.00	0.05	
Colombia	0.00		
Paraguay		0.09	
Mexico		0.00	
Uruguay		0.00	
Australia			0.42
Austria			0.00
Denmark			0.00
France			0.00
Germany			0.00
Netherlands (the)			0.23
New Zealand			0.00
Sweden			0.00
Switzerland			0.00
USA			0.35

C Clustering methodology and results

C.1 Methodologies

Hierarchical Clustering (Ward Method)

Hierarchical clustering builds a nested hierarchy of clusters by successively merging or splitting groups of countries based on their similarity. In the Ward method, clusters are merged to minimize the increase in within-cluster variance, defined as:

$$\Delta ESS = \sum_{x_k \in C_i \cup C_j} ||x_k - \mu_{C_i \cup C_j}||^2 - \left(\sum_{x_k \in C_i} ||x_k - \mu_{C_i}||^2 + \sum_{x_k \in C_j} ||x_k - \mu_{C_j}||^2 \right)$$

Where x_k represents the characteristics of country k, which may include various economic or financial indicators relevant to the analysis. The clusters being merged at each step are denoted as C_i and C_j, while μ_{C_i} and μ_{C_j} represent the centroids of these clusters. These centroids serve as the average vectors of the countries within each cluster, guiding the algorithm in determining which clusters should be merged to minimize the overall variance.

Countries are assigned to clusters based on proximity to centroids, minimizing overall variance with each merge. The process iterates until a predefined number of clusters or a stopping criterion is reached.

Spectral Clustering

Spectral clustering leverages the eigenvectors of a similarity matrix to identify clusters in a lower-dimensional space. A similarity matrix W is constructed, where W_{ij} quantifies the similarity between countries i and j:

$$W_{ij} = \exp\left(-\frac{||x_i - x_j||^2}{2\sigma^2} \right)$$

The algorithm computes the normalized Laplacian matrix:

$$L = D^{-1/2} W D^{-1/2}$$

where D is a diagonal matrix with $D_{ii} = \sum_j W_{ij}$. Clusters are identified by applying k-means to the eigenvectors of L, grouping countries based on their positions in the transformed space.

BIRCH Clustering

BIRCH (Balanced Iterative Reducing and Clustering using Hierarchies) is a hierarchical clustering algorithm designed for large datasets, focusing on efficiency and memory usage. It creates a *CF-tree (Clustering Feature Tree)*, which summarizes the data points into compact clusters.

Each node in the CF-tree contains a *Clustering Feature (CF)* vector, which consists of three components. The first component, N, represents the number of countries in the cluster. The second component, LS (Linear Sum), is the sum of all data points (countries) within the cluster. Finally, the third component, SS (Squared Sum), captures the sum of the squares of these data points. Together, these components summarize the cluster's structure and characteristics, enabling efficient clustering while preserving essential information about the countries.

The CF vector is defined as:

$$CF = (N, LS, SS)$$

As new countries are processed, they are assigned to the cluster (node) that minimizes the distance to the cluster's centroid, represented by the CF values. If a country is too distant from any existing node, a new cluster is created. This process repeats as the CF-tree is incrementally built. Later, a traditional clustering algorithm is applied to the centroids of these clusters to finalize the clustering.

K-Means Clustering

K-means clustering is an iterative algorithm that partitions the dataset into k clusters, aiming to minimize the *within-cluster sum of squares* (WCSS), which measures the variance within each cluster. The algorithm starts by randomly selecting k initial centroids, which represent the center of each cluster. The K-means clustering algorithm proceeds in two main steps. First, during the **assignment step**, each country is assigned to the cluster whose centroid is closest, as determined by the *Euclidean distance*. The distance $d(x_i, \mu_j)$ is calculated as $||x_i - \mu_j||$, where x_i represents the characteristics of country i, and μ_j denotes the centroid of cluster j.

Next, in the **update step**, after all countries have been assigned to clusters, the centroids of the clusters are recalculated. Each centroid μ_j is updated as the mean of all countries within its cluster, given by:

$$\mu_j = \frac{1}{|C_j|} \sum_{x_i \in C_j} x_i$$

Here, C_j is the set of countries in cluster j, and $|C_j|$ represents the number of countries in that cluster. These two steps are repeated iteratively until the centroids stabilize, ensuring that the clustering solution accurately represents the underlying structure of the data.

A country is assigned to a cluster based on the minimum distance between its position and the current centroids of the clusters. This process continues until the centroids stabilize and no significant changes occur between iterations, ensuring that each country belongs to the cluster whose centroid is closest in terms of Euclidean distance.

C.2 Results

This appendix presents the clustering methodology and pre-intervention characteristics for each treated country, including Mexico, Peru, and the United Kingdom, highlighting the systematic approach used in constructing donor pools for the SCM analysis. The clustering figures illustrate the identification of structurally comparable countries using economic and fiscal indicators, while the tables summarize the pre-treatment characteristics of the selected donor pools. By ensuring a close match between treated and synthetic units, this methodology strengthens the credibility and precision of the SCM results.

The appendix also provides the full set of SCM visualizations for high-frequency variables, specifically EMBI and CDS spreads, for Peru, India, Colombia, Brazil, Honduras, and Paraguay. These figures detail the post-treatment impacts of EC activation, with significant reductions in sovereign risk metrics observed across different countries. Together, these results validate the robustness of the analysis and provide additional evidence for the conclusions drawn in Section 4.

Mexico

Figure 5: Clustering Results for Donor Pool Selection: Mexico

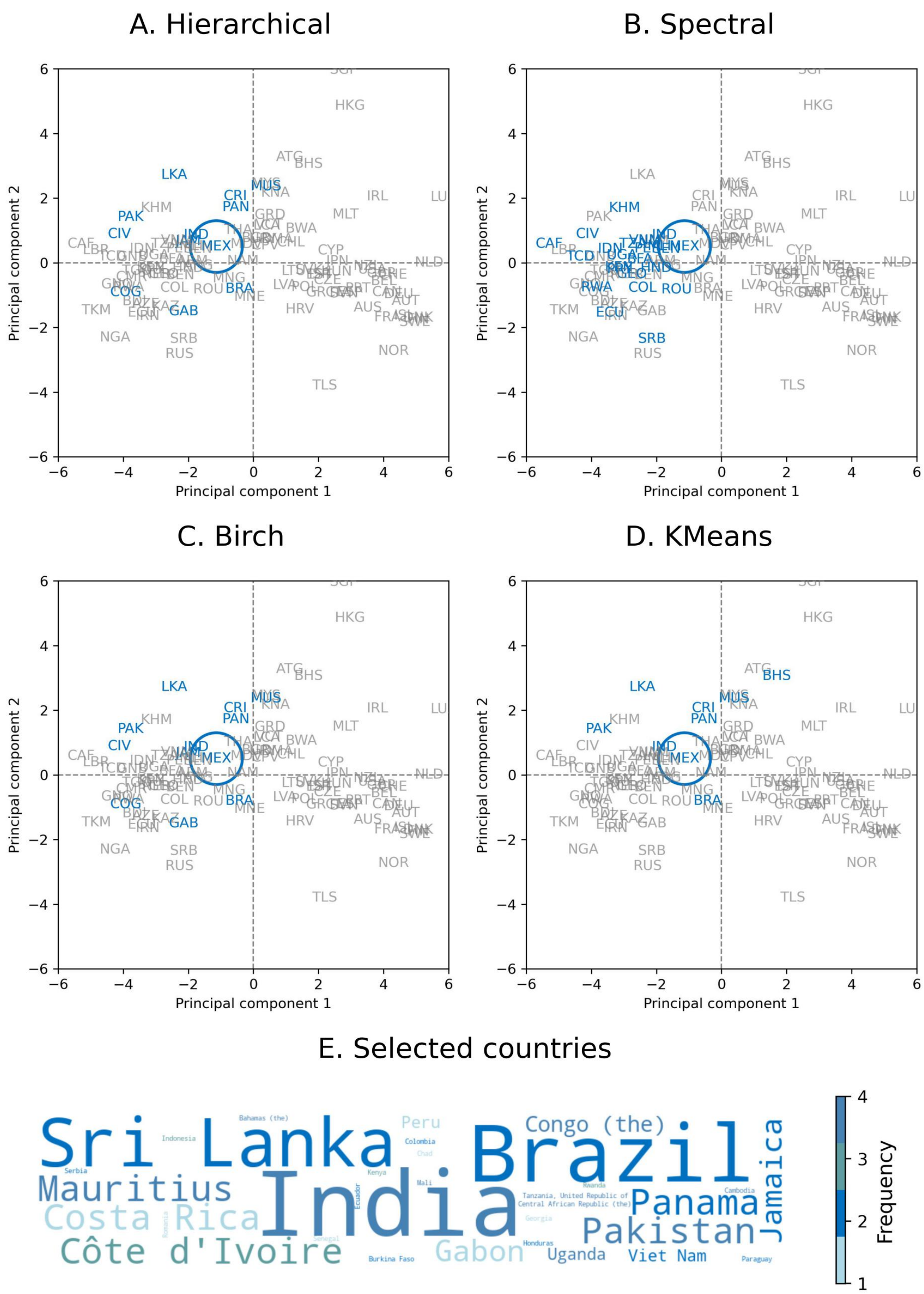


Table 11: **Pre-intervention characteristics for clustering: Mexico**

Category	**Variable**	**Mex**	**Mean C**	**HR**	**SP**	**BC**	**KM**
Aggregate Balance	Interest Expense (% GDP)	0.03	0.04	0.05	0.02	0.05	0.04
	Current Expenditure (% GDP)	0.15	0.15	0.15	0.13	0.15	0.15
	Total Expenditure (% GDP)	0.21	0.22	0.23	0.20	0.23	0.22
	Fiscal Revenue (% GDP)	0.19	0.19	0.21	0.18	0.21	0.18
	Primary Balance (% GDP)	0.01	0.01	0.02	-0.00	0.02	-0.00
External Finances	Trade Openness: Exports + Imports (% GDP)	0.51	0.66	0.72	0.56	0.72	0.65
	International Reserves (% GDP)	0.07	0.10	0.10	0.13	0.10	0.10
	Total International Reserves (% CAP)	0.26	0.41	0.29	0.72	0.29	0.32
	Net foreign direct investment (% GDP)	-0.15	-0.15	-0.14	-0.19	-0.14	-0.14
Financing Resilience	Interest Payments (% Fiscal Revenue)	0.17	0.21	0.25	0.09	0.25	0.23
	Gross Debt (% GDP)	0.41	0.65	0.74	0.54	0.74	0.58
Governance	Government Effectiveness (WGI)	0.19	-0.20	-0.21	-0.57	-0.21	0.17
	Control of Corruption (WGI)	-0.23	-0.33	-0.33	-0.70	-0.33	0.04
	Regulatory Quality (WGI)	0.20	0.10	0.10	0.20	0.15	0.12
	Political Stability and Absence of Violence (WGI)	0.10	-0.10	-0.05	-0.02	-0.10	0.00
	Voice and Accountability (WGI)	0.25	0.30	0.29	0.15	0.27	0.25
	Rule of Law (WGI)	0.10	0.00	-0.02	0.00	0.10	0.05
Natural resources	Commodity dependence	0.13	0.24	0.29	0.30	0.29	0.08
Real variables & prices	Inflation Rate (%)	0.06	0.06	0.06	0.08	0.06	0.06
	Per Capita Real Consumption in PPP	12160	6309	6170	3517	6170	9379
	Real internal rate of return (%)	0.13	0.15	0.15	0.12	0.15	0.18
	Broad Money Supply (% GDP)	0.26	0.48	0.45	0.26	0.45	0.78
	Unemployment Rate (%)	0.03	0.09	0.10	0.06	0.10	0.08

Peru

Figure 6: Clustering Results for Donor Pool Selection: Peru

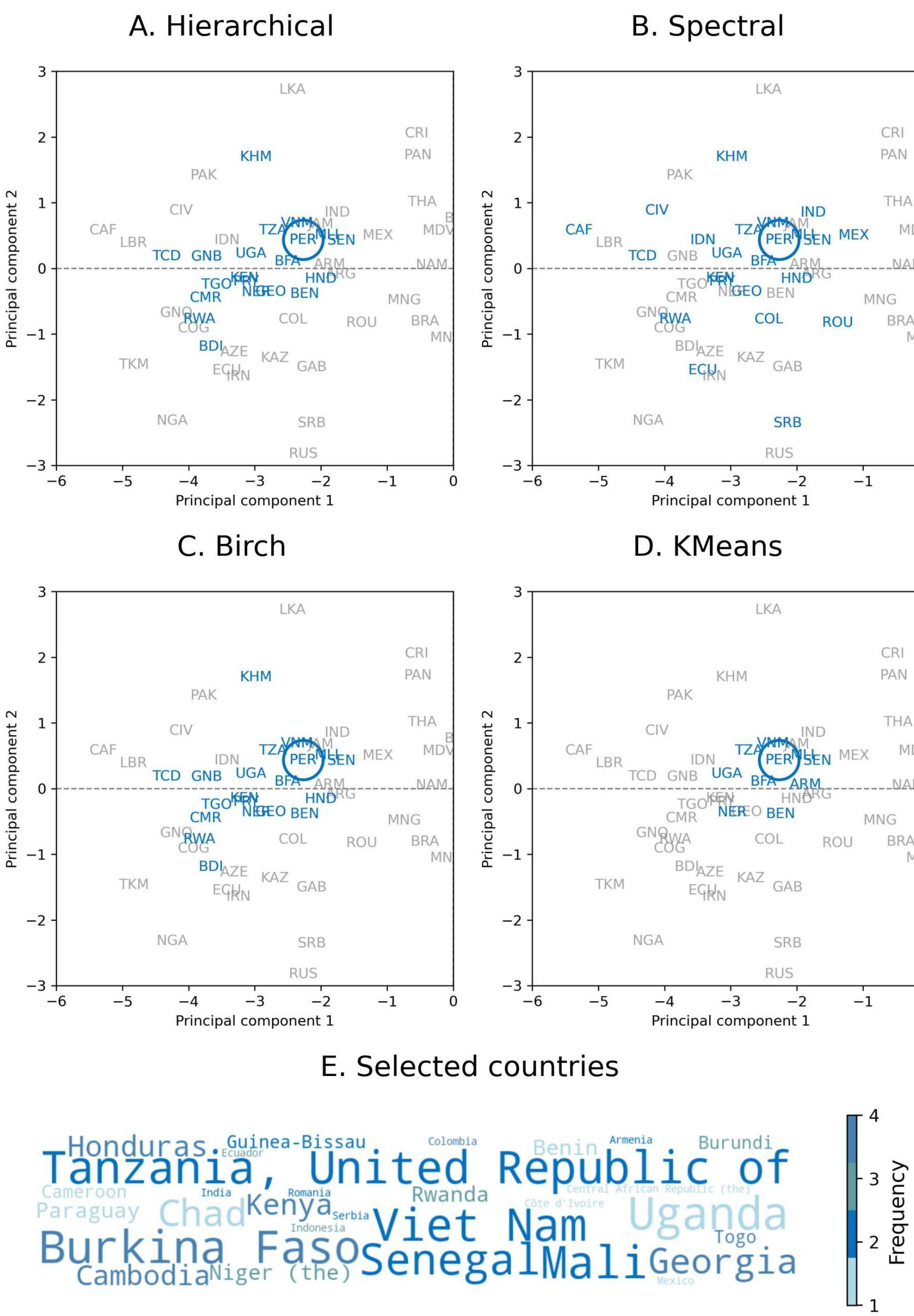


Table 12: **Pre-intervention characteristics for clustering: Peru**

Category	**Variable**	**Per**	**Mean C**	**HR**	**SP**	**BC**	**KM**
Aggregate Balance	Interest Expense (% GDP)	0.02	0.01	0.01	0.02	0.01	0.01
	Current Expenditure (% GDP)	0.16	0.11	0.11	0.13	0.11	0.11
	Total Expenditure (% GDP)	0.20	0.18	0.18	0.20	0.18	0.18
	Fiscal Revenue (% GDP)	0.19	0.16	0.16	0.18	0.16	0.16
	Primary Balance (% GDP)	0.01	-0.01	-0.01	0.00	-0.01	-0.01
External Finances	Trade Openness: Exports + Imports (% GDP)	0.39	0.53	0.54	0.56	0.54	0.48
	International Reserves (% GDP)	0.18	0.11	0.11	0.13	0.11	0.12
	Total International Reserves (% CAP)	0.80	0.52	0.49	0.72	0.49	0.46
	Net foreign direct investment (% GDP)	-0.21	-0.16	-0.16	-0.19	-0.16	-0.15
Financing Resilience	Interest Payments (% Fiscal Revenue)	0.12	0.08	0.08	0.09	0.08	0.06
	Gross Debt (% GDP)	0.45	0.57	0.62	0.54	0.62	0.45
Governance	Government Effectiveness (WGI)	-0.36	-0.64	-0.71	-0.57	-0.71	-0.44
	Control of Corruption (WGI)	-0.29	-0.72	-0.78	-0.70	-0.78	-0.54
	Regulatory Quality (WGI)	0.20	0.10	0.10	0.20	0.15	0.12
	Political Stability and Absence of Violence (WGI)	0.10	-0.10	-0.05	-0.02	-0.10	0.00
	Voice and Accountability (WGI)	0.25	0.30	0.29	0.15	0.27	0.25
	Rule of Law (WGI)	0.10	0.00	-0.02	0.00	0.10	0.05
Natural Resources	Commodity dependence	0.13	0.24	0.29	0.30	0.29	0.08
Real Variables & Prices	Inflation Rate (%)	0.02	0.05	0.04	0.08	0.04	0.03
	Per Capita Real Consumption in PPP	4623	2288	2024	3517	2024	2117
	Real internal rate of return (%)	0.17	0.11	0.10	0.12	0.10	0.12
	Broad Money Supply (% GDP)	0.12	0.21	0.20	0.26	0.20	0.19
	Unemployment Rate (%)	0.09	0.05	0.05	0.06	0.05	0.07

United Kingdom

Figure 7: Clustering Results for Donor Pool Selection: United Kingdom

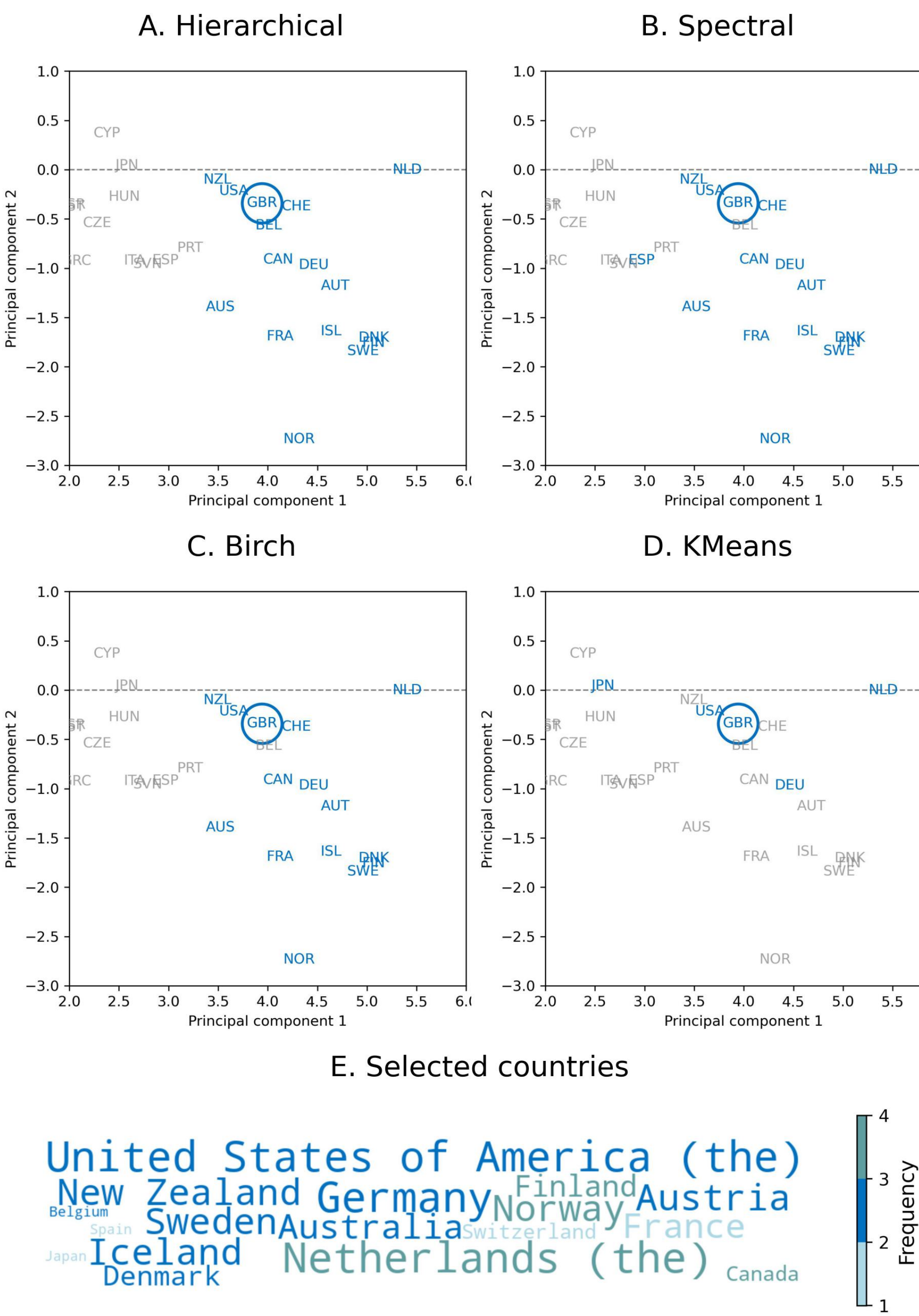


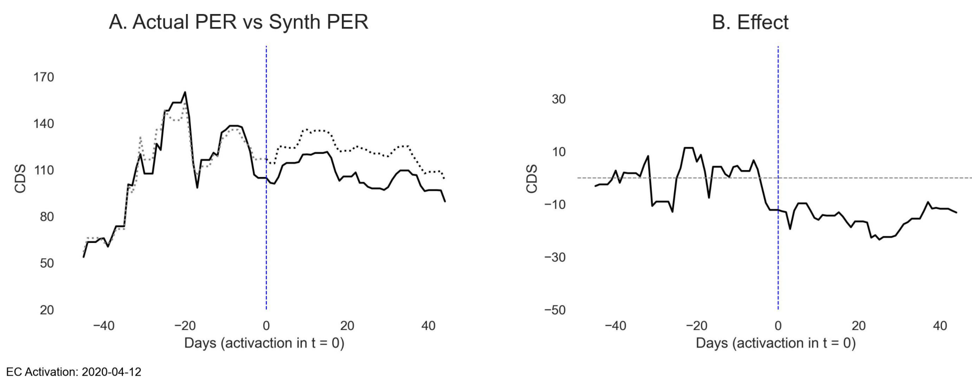
Table 13: Pre-intervention characteristics for clustering: United Kingdom

Category	**Variable**	**UK**	**Mean C**	**HR**	**SP**	**BC**	**KM**
Aggregate Balance	Interest Expense (% GDP)	0.01	0.01	0.02	0.01	0.01	0.01
	Current Expenditure (% GDP)	0.36	0.39	0.40	0.40	0.40	0.36
	Total Expenditure (% GDP)	0.36	0.43	0.44	0.43	0.43	0.39
	Fiscal Revenue (% GDP)	0.35	0.43	0.44	0.44	0.44	0.36
	Primary Balance (% GDP)	-0.00	0.02	0.02	0.02	0.02	-0.01
External Finances	Trade Openness: Exports + Imports (% GDP)	0.52	0.52	0.74	0.69	0.69	0.55
	International Reserves (% GDP)	0.03	0.03	0.07	0.07	0.07	0.05
	Total International Reserves (% CAP)	0.07	0.14	0.13	0.13	0.13	0.22
	Net foreign direct investment (% GDP)	0.28	0.11	0.09	0.09	0.11	0.16
Financing Resilience	Interest Payments (% Fiscal Revenue)	0.04	0.04	0.04	0.04	0.03	0.05
	Gross Debt (% GDP)	0.36	0.56	0.54	0.51	0.51	0.73
Governance	Government Effectiveness (WGI)	1.83	1.86	1.90	1.89	1.90	1.68
	Control of Corruption (WGI)	2.03	1.98	2.01	2.04	2.04	1.79
	Regulatory Quality (WGI)	0.20	0.10	0.10	0.20	0.15	0.12
	Political Stability and Absence of Violence (WGI)	0.10	-0.10	-0.05	-0.02	-0.10	0.00
	Voice and Accountability (WGI)	0.25	0.30	0.29	0.15	0.27	0.25
	Rule of Law (WGI)	0.10	0.00	-0.02	0.00	0.10	0.05
Natural Resources	Commodity dependence	0.11	0.16	0.17	0.17	0.18	0.07
Real Variables & Prices	Inflation Rate (%)	0.01	0.02	0.02	0.02	0.02	0.02
	Per Capita Real Consumption in PPP	30152	29351	29015	28802	29184	31076
	Real internal rate of return (%)	0.10	0.07	0.07	0.07	0.07	0.07
	Broad Money Supply (% GDP)	1.93	1.49	1.29	1.28	1.30	2.45
	Unemployment Rate (%)	0.05	0.06	0.06	0.06	0.06	0.06

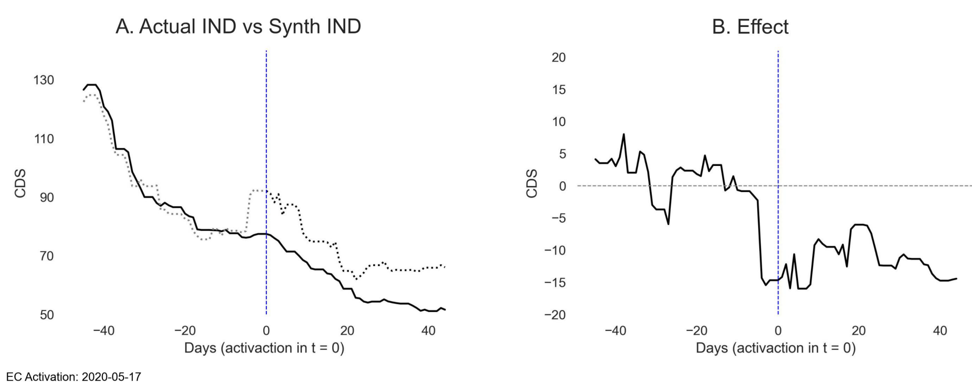
D High-frequency variables SCM results

This appendix provides the complete set of Synthetic Control Method visualizations for high-frequency variables, including EMBI and CDS spreads, complementing the results discussed in Section 4. The figures depict the observed and synthetic trajectories for each treated country, offering a detailed representation of the market responses to EC activation. These visualizations support the findings presented in the main text and serve as a reference for the detailed dynamics of sovereign risk metrics following EC activation.

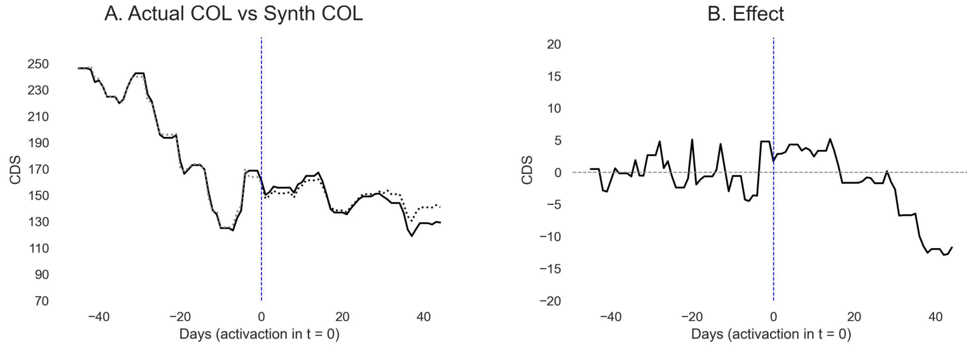
Peru



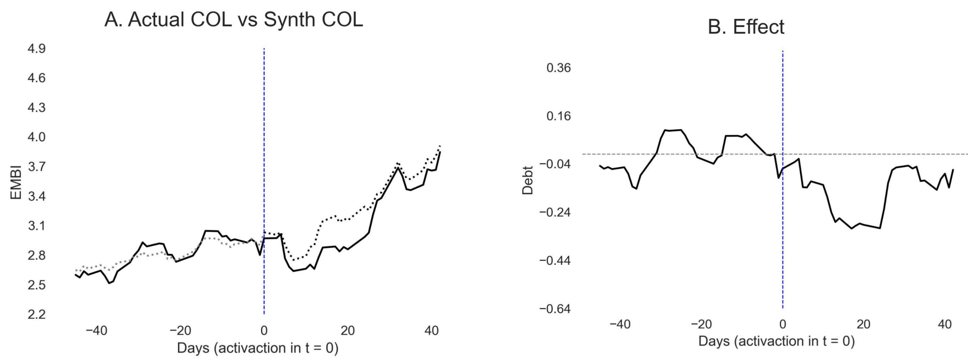
India



Colombia

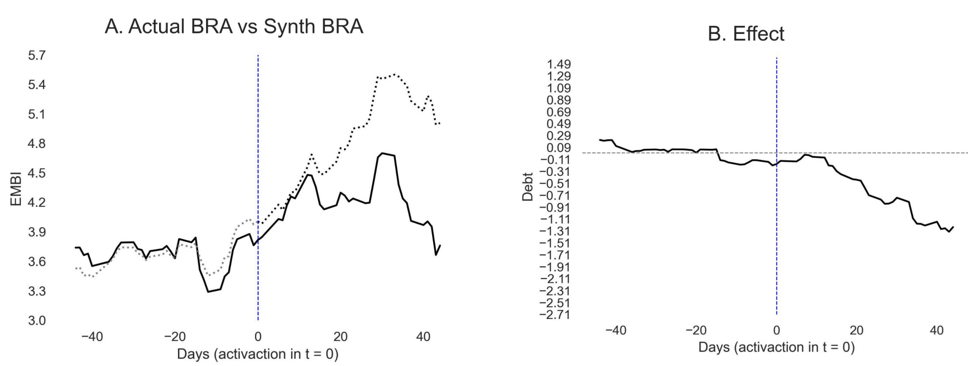


EC Activation: 2020-06-15



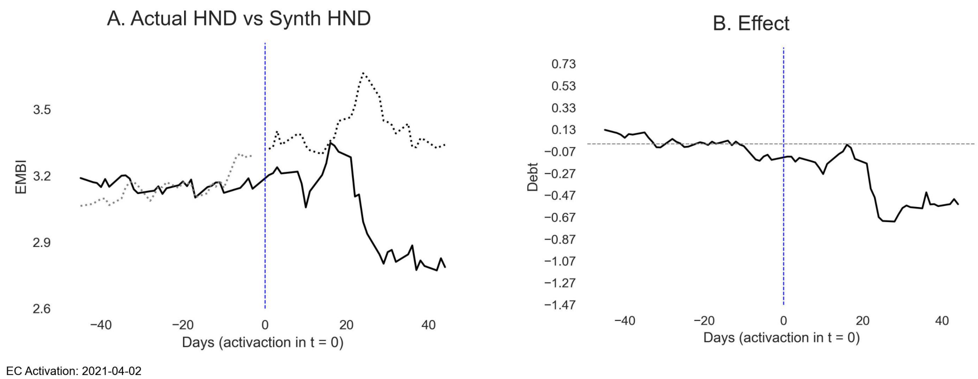
EC Activation: 2020-06-15

Brazil



EC Activation: 2020-05-27

Honduras



Paraguay