

Political instability, global value chains, and structural transformation: Synthetic control evidence from Madagascar

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Labor-intensive manufacturing has been identified as a critical pathway to structural transformation in low-income economies, yet political instability can undermine this process in ways that go beyond simple output losses. This paper examines how the 2009 unconstitutional change of government in Madagascar affected the composition—not merely the level—of the country’s integration into global value chains (GVCs). Using the Synthetic Control Method (SCM) on annual data over the 1996–2018 period, we construct a credible counterfactual by weighting a donor pool of low-income economies that shared Madagascar’s pre-crisis macroeconomic and institutional characteristics. We distinguish between backward GVC participation—the share of foreign value added in gross exports, closely linked to contract-intensive manufacturing—and forward GVC participation—the share of domestic value added embedded in third-country exports, more closely associated with primary commodity exports. We find a large and persistent post-2009 decline in backward participation relative to the synthetic counterfactual, alongside a smaller but sustained positive divergence in forward participation. Supplementary SCM exercises indicate a concurrent deterioration in Rule of Law and Control of Corruption, consistent with the proposed transmission mechanism. Placebo tests suggest these patterns are unlikely to be driven by chance. The findings indicate that political instability can act as an institutional filter that disproportionately

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crowds out contract-intensive activities, shifting an economy's integration toward less employment-generating and more rent-dependent segments of global production networks. Structural transformation; Sub-Saharan Africa. **Keywords:** Political instability; Global Value Chains; Synthetic Control Method; **JEL Classification:** F14, O14, O55.

1 Introduction

Labor-intensive manufacturing constitutes a well-established engine of structural transformation in low-income economies (Rodrik 2016). Integration into Global Value Chains (GVCs) via backward linkages—the assembly of imported intermediate inputs for re-export—has historically offered developing countries a pathway to formal employment, technology transfer, and industrial upgrading (Baldwin 2016; Johnson and Noguera 2012). Yet the conditions under which countries sustain this form of integration are poorly understood, particularly in the presence of recurrent political instability. Madagascar illustrates this puzzle sharply. Despite a cost-competitive labor force, a strategic geographic position, and a nascent light manufacturing sector in the early 2000s, the country has experienced a marked divergence from its Sub-Saharan African (SSA) peers since its independence (Razafindrakoto et al. 2015). Existing studies largely attribute this trajectory to successive political crises (Fontaine and Razafindravaosolonirina 2022), but they have focused almost exclusively on aggregate output losses rather than on the structural consequences for trade composition.

What is lacking in the recent literature is an understanding of how political instability alters the *qualitative* structure of a country’s international integration. Standard cross-country regressions linking instability to growth provide mixed evidence (Haan 2007; Jong-A-Pin 2009) and are ill-suited to identifying the sectoral reallocation effects that follow a specific institutional disruption. To address this gap, we propose an original theoretical formalization : political instability does not affect all forms of international integration symmetrically. Rather, it operates through what we term an *institutional filter*: a mechanism whereby instability raises transaction costs disproportionately in sectors with high contractual intensity—such as manufacturing assembly—while leaving relatively unaffected, or even inadvertently favoring, captive extractive industries with high sunk costs and limited relocatability (Asiedu 2006; Antràs 2015). Empirically, our results validate this proposition by revealing a profound and asymmetric sectoral reallocation post-crisis, locking the economy into a rent-dependent equilibrium.

To identify the causal effect of the 2009 crisis, we exploit three features that make it a credible quasi-natural experiment: its largely unanticipated nature (it erupted mid-presidential term), its abrupt rupture with the international community (including immediate exclusion from the African Growth and Opportunity Act, or AGOA), and its exceptional duration—the unconstitutional High Transitional Authority (HAT) governed the country for nearly five years without electoral mandate. We construct a donor pool of 45 low-income economies (GDP per capita below US\$4,000 in 2009) that did not experience a comparable institutional shock, and validate the approach through standard in-space placebo tests.

The results indicate a large and persistent post-2009 decline in Madagascar’s backward GVC participation relative to its synthetic counterfactual, alongside a smaller but sustained positive divergence in forward participation. Supplementary exercises reveal concurrent deterioration in both Rule of Law and Control of Corruption scores, consistent with the institutional filter mechanism. These findings suggest that political instability can hinder structural transformation not only by reducing aggregate output, but also by reorienting international integration toward less employment-intensive, more rent-dependent activities—a result with implications extending well beyond the Malagasy case.

This paper contributes to the literature in three important ways. First, we provide a theoretical formalization of the institutional filter mechanism, grounded in the contractual theory of trade (Antràs 2003; Nunn 2007), that generates testable predictions about the differential vulnerability of backward and forward GVC linkages to political shocks. Second, we provide, to our knowledge, the first application of the Synthetic Control Method (SCM) to GVC indicators for Madagascar, utilizing the EORA-26 MRIO database over the 1996–2018 period. Third, our empirical strategy explicitly incorporates institutional predictors—Control of Corruption and Rule of Law from the World Governance Indicators (WGI)—into the SCM optimization. The synthetic counterfactual is therefore not an idealized, corruption-free economy, but a composite of developing countries sharing Madagascar’s pre-crisis structural and institutional characteristics. Any post-2009 divergence thus isolates the effect of the *breakdown* of the institutional order, holding initial governance quality constant.

The rest of the paper is organized as follows. Section 2 provides the political and institutional background of Madagascar. Section 3 presents the theoretical framework and literature review. Section 4 describes the empirical strategy and data. Section 5 discusses the main results and robustness checks. Section 6 presents mechanism evidence based on institutional SCM exercises. Section 7 concludes.

2 Political and Institutional Background of Madagascar

2.1 A Trajectory of Cyclical Instability

Madagascar’s development trajectory has been shaped by recurrent political crises since its independence in 1960. Figure Figure 1 traces the country’s institutional evolution from the mid-1950s onward, while Figure Figure 2 plots the Polity5 index—a standard measure of democratic quality used in the political economy literature (Aisen and Veiga 2013; Acemoglu et al. 2019). The country has adopted four constitutions and transitioned through four republics. The first two republics (1959–1992) were characterized by socialist orientation and strong centralization, yielding persistently negative Polity scores. The transition to the Third Republic in 1992 initiated a phase of democratization and economic liberalization, significantly improving institutional scores and opening the economy to export-oriented investment¹.

The 2002 presidential election produced a severe six-month post-electoral crisis between incumbent Didier Ratsiraka and challenger Marc Ravalomanana, effectively bisecting the country and disrupting internal trade. Following a period of paralysis, Ravalomanana’s presidency (2002–2009) was associated with an expansion phase: annual GDP growth averaged above 5%, driven primarily by textile Export Processing Zones (EPZs) benefiting

¹It is worth noting that this cyclical instability persists, as evidenced by the recent political unrest and the coup d’état of December 2025. Beyond the immediate political implications, this event highlights the profound hysteresis affecting investor expectations. For contract-intensive GVCs, it confirms that the post-2013 return to constitutional order was merely a fragile interlude rather than a structural shift toward the legal predictability required for long-term manufacturing investments

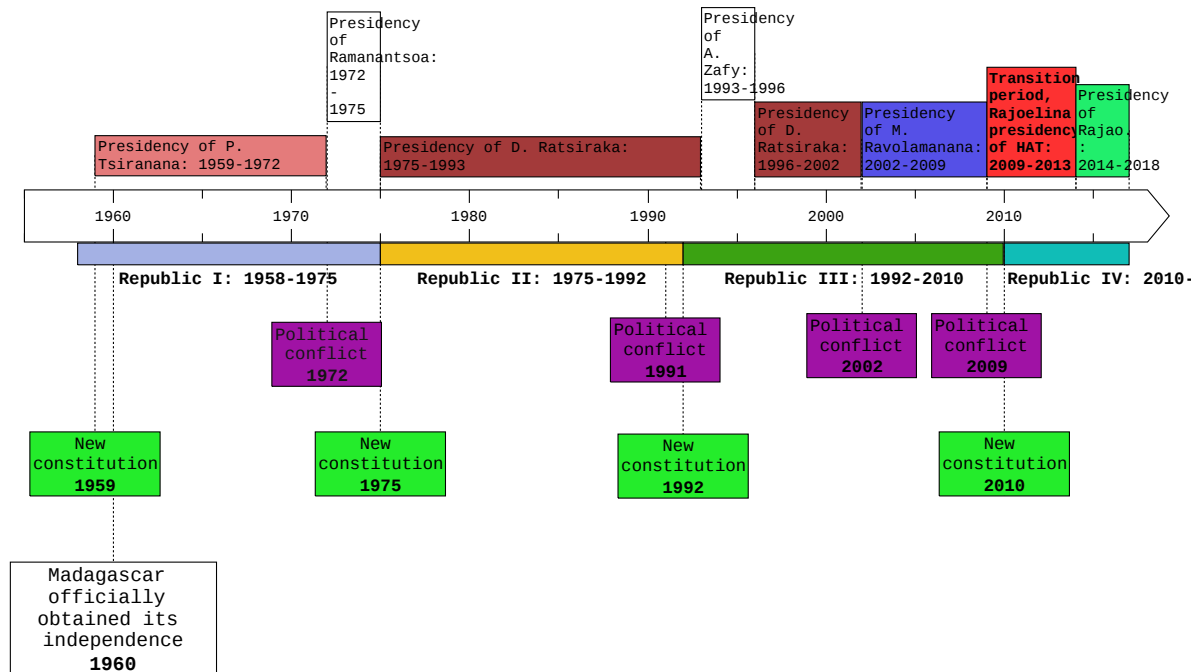


Figure 1: Political evolution in Madagascar since 1955

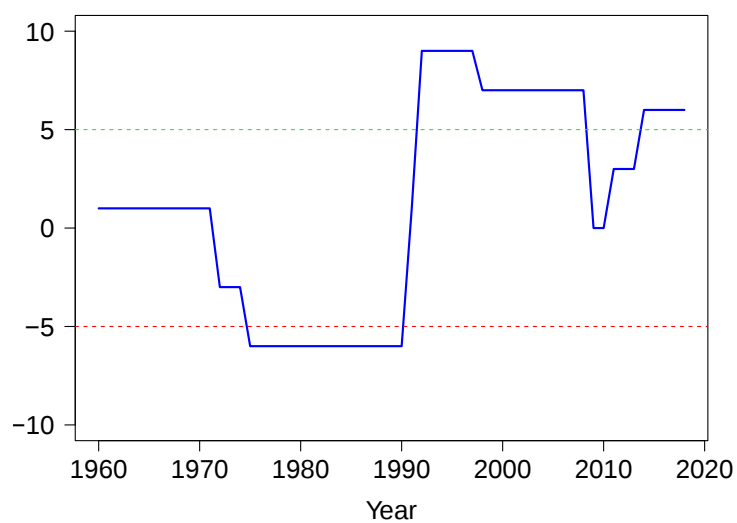


Figure 2: The Malagasy polity index since its independence

from duty-free access to the United States market under the African Growth and Opportunity Act (AGOA), and by large inflows of resource-seeking Foreign Direct Investment (FDI) into the mining sector—notably the Ambatovy nickel-cobalt project and the QMM ilmenite mine. This period established a dual productive structure: a fragile, contract-intensive light manufacturing sector dependent on trade preferences, alongside a capital-intensive extractive sector anchored by high sunk costs ([Razafindrakoto et al. 2020](#)).

2.2 The 2009 Crisis as a Quasi-Natural Experiment

From the perspective of causal identification, the 2009 crisis possesses three properties that distinguish it from earlier episodes of Malagasy instability and support its use as a treatment event.

First, the shock was largely unanticipated. Unlike the crises of 1972, 1991, and 2002, which arose from electoral disputes, the 2009 crisis erupted mid-presidential term, triggered by a conflict between President Ravalomanana and the mayor of Antananarivo, Andry Rajoelina. In February–March 2009, a mutiny by the Army Corps of Personnel and Administrative and Technical Services (CAPSAT) forced Ravalomanana to resign, and power was transferred to Rajoelina via an unconstitutional High Transitional Authority (HAT). The mid-term, extra-electoral nature of the shock substantially reduces concerns about anticipation effects.

Second, the crisis generated an immediate and measurable exogenous disruption to the manufacturing sector. The unconstitutional change of government triggered Madagascar’s exclusion from AGOA in late 2009 and the suspension of most bilateral aid, which had historically financed approximately half of the national budget. As documented by Fukunishi ([2013](#)), the loss of preferential market access led to rapid factory closures and the destruction of tens of thousands of formal urban jobs in the textile sector. This policy shock provides a direct, externally-imposed channel through which the political crisis affected backward GVC integration.

Third, the duration of the transition was exceptional. The HAT governed without electoral mandate for nearly five years (2009–2013), prolonging the period of legal uncertainty. This extended duration favored a structural reallocation: efficiency-seeking FDI—characterized by low sunk costs and high geographic mobility—exited or did not renew investments, while resource-seeking FDI in the extractive sector—already committed through large sunk costs—remained and adapted to the new institutional environment.

2.3 Post-Transition Persistence (2014–2018)

The return to constitutional order in late 2013, with the election of Hery Rajaonari-mampianina, initiated a phase of institutional normalization. Madagascar was reinstated into AGOA in 2014 and international aid flows resumed. However, as our empirical results document, the post-crisis decade did not reverse the structural shift in GVC composition that occurred after 2009. This persistence is consistent with hysteresis effects in productive

capacity and investor confidence: the institutional conditions required to attract contract-intensive manufacturing—predictable rule of law, accessible logistics, and trade policy stability—recovered far more slowly than the formal democratic indicators. The 2014–2018 period therefore constitutes the post-treatment phase in our empirical framework, bounded by the availability of EORA-26 data. This window is sufficient to assess the medium-run effects of the 2009 shock on GVC integration and institutional quality.

3 Theoretical Framework and Literature Review

Our analysis is anchored at the intersection of three strands of literature: the institutional economics of international trade, the theory of investment under uncertainty, and the political economy of rent-seeking.

3.1 The Institutional Economics of Trade and Global Value Chains

While the Heckscher-Ohlin theory of factor endowments explains intersectoral specialization through relative differences in production factors between countries, this framework remains silent on the fine-grained fragmentation of productive processes observed in Global Value Chains (GVCs). A first strand of literature formalizes the international fragmentation of production within a contractual framework. Building on the theory of incomplete contracts, Antràs (2003) demonstrates that the international organization of production depends on the allocation of residual control rights. Firms arbitrate between vertical integration and outsourcing depending on the intensity of specific inputs and the risk of hold-up (Antràs and Helpman 2004; Antràs and Chor 2013). Spencer (2005) offers a synthesis of this literature, showing how specific relational investments and incomplete contracts constitute the fundamental concepts explaining international outsourcing decisions.

Building upon this, empirical studies establish that institutional quality constitutes a source of comparative advantage in its own right. Countries with more effective institutions export relatively more in industries intensive in complex contractual relationships or specific investments (Levchenko 2007; Nunn 2007; Costinot 2009; Krishna and Levchenko 2013; Fałkowski et al. 2018; Wu and Yan 2018). Nunn and Trefler (2014) provide a systematic review confirming that institutions operate as a productive endowment distinct from traditional factors, with an impact quantitatively comparable to that of physical capital and skilled labor. Although these authors use different metrics—Levchenko (2007) measures institutional dependence by the concentration of intermediate inputs, while Nunn (2007) measures it by the intensity of specific relational investments, and Costinot (2009) by the complexity of productive tasks—they converge on the conclusion that the quality of the legal and contractual framework structures specialization.

This relationship is robust across various contexts. Ferguson and Formai (2013) show that firms can partially compensate for institutional failures through their organizational form. Furthermore, the scope of these results extends to investment dynamics and macroeconomic volatility. Seitz and Watzinger (2017) establish a direct link between contractual institutions and innovation capacity, while Krishna and Levchenko (2013) show

that countries with weaker institutions specialize in less complex goods, exposing them to higher productive volatility.

This perspective is particularly relevant in the context of GVCs (Baldwin 2016; Johnson and Noguera 2012; Koopman et al. 2014). Integration via Backward Linkages—the importation of intermediate inputs intended to be transformed and then re-exported—involves a multiplicity of incomplete contracts, strong sequential interdependence, and synchronized logistics (Antràs 2003). On a sample of 63 countries over the 2005-2015 period, Barbero and Rodríguez-Crespo (2020) confirm that institutional quality is positively associated with GVC participation. Their results reveal that institutional dimensions exert differentiated effects: Voice and Accountability is more associated with backward participation, while the Rule of Law and Political Stability favor forward participation (OECD 2018).

Blyde (2012) shows that the insertion of Latin American and Caribbean countries is biased towards arm’s-length transactions in labor-intensive industries that do not require specific relational investments. Countries that have successfully diversified their exports have combined outsourcing and intra-firm trade, which precisely requires superior institutional quality (Chen and Shao 2019). The OECD (2018) study confirms that countries with good institutions specialize in the downstream stages of production, a result consistent with the theoretical framework of Antràs and Gortari (2020).

The structural sensitivity of GVCs to institutional and economic shocks is documented by several recent works. Comi et al. (2024) demonstrate that the 2008 financial crisis modified specialization structures heterogeneously. Köhler and Kukharskyy (2019) develop a theoretical framework showing that uncertainty and local labor market rigidities reduce the propensity to offshore. In the context of developing economies, shocks asymmetrically reconfigure GVC participation (Fernandes et al. 2020; Adarov and Stehrer 2021). Existing studies show that backward linkages are structurally more vulnerable to disruptions due to their dependence on contractual and logistical coordination (Mora et al. 2018; Veeramani and Dhir 2022).

Consequently, countries characterized by low institutional quality appear structurally disadvantaged in their integration into GVCs via Backward Linkages. Conversely, Forward Linkages—exports of primary inputs incorporated into the exports of other countries—are generally less sensitive to local contractual frictions (Antràs and Gortari 2020; Barbero and Rodríguez-Crespo 2020). In several African economies, legal insecurity tends to orient operators towards extractive activities (Mehlum et al. 2006).

3.2 Formalization of the “Institutional Filter” Model

To fix ideas, we model the impact of political instability (θ) on the expected profitability of firms according to their mode of insertion into GVCs ($k \in \{B, F\}$). While building upon the foundational framework of Antràs (2003), this specific formalization of the institutional filter applied to GVC composition is, to our knowledge, original to this paper. Following the incomplete contracts literature, production requires a generic factor L and relationship-specific intermediate inputs $z \in [0, 1]$:

$$Y_k = A_k (L_k)^{1-\phi_k} \left(\int_0^1 x_k(z)^\alpha dz \right)^{\frac{\phi_k}{\alpha}}$$

The parameter $\phi_k \in (0, 1)$ captures the sector's contractual intensity. We maintain the standard assumption, an assumption solidly supported by the literature ([Krishna and Levchenko 2013](#); [Fałkowski et al. 2018](#)), that manufacturing assembly is more contract-intensive than extractive industries ($\phi_B > \phi_F$).

Political instability $\theta \in [0, 1]$ degrades the rule of law, meaning contracts are only enforceable with probability $q(\theta) = 1 - \theta$. Anticipating hold-up, suppliers under-invest, which acts as a wedge on the effective marginal cost $c_k(\theta)$:

$$c_k(\theta) = c_0 \left(\frac{1}{1 - \beta\theta} \right)^{\phi_k}$$

Operating profits thus depend on this institutional friction and sector-specific sunk costs f_k :

$$\Pi_k(\theta) = \Psi_k [c_k(\theta)]^{1-\sigma} - f_k$$

The filtering mechanism emerges mathematically through the cross-derivative of the cost function:

$$\frac{\partial^2 \ln(c_k)}{\partial \theta \partial \phi_k} = \frac{\beta}{1 - \beta\theta} > 0$$

An abrupt increase in instability ($\Delta\theta$) disproportionately penalizes contract-intensive sectors. This establishes a critical threshold θ^* where $\Pi_B < 0$ (exit of manufacturing firms with low sunk costs) while $\Pi_F > 0$ (retention of extractive firms bound by massive sunk costs), thereby locking the economy into a rent-dependent equilibrium.

3.3 FDI Heterogeneity and the Rent Trap

The literature on foreign direct investment (FDI) classically distinguishes between efficiency-seeking and resource-seeking strategies. This typology allows us to analyze how instability operates as a form of adverse selection among FDIs based on their mobility. Efficiency-seeking FDIs insert themselves into the manufacturing segments of GVCs with low sunk costs and high geographical mobility. Their exposure to institutional shocks is high: a political deterioration leads to almost immediate relocation. Conversely, resource-seeking FDIs exploit immobile natural resources and involve massive sunk costs ([Asiedu 2006](#)). These firms, having become “captive” ([Hajzler 2014](#)), adopt adaptation strategies via direct negotiations or the contracting of private security ([Asiedu and Lien 2011](#)).

The combination of these two effects leads to the “premature deindustrialization” documented by Rodrik ([2016](#)). In Madagascar, instability exacerbates the voracity effect

theorized by Tornell and Lane (1999). In the presence of weak institutions and natural resources, interest groups engage in aggressive redistributive competition for rent appropriation. The weakness of institutions reconfigures the productive structure to perpetuate this very weakness, linking the theory of institutional comparative advantage to the political economy of rent-seeking.

The theoretical predictions outlined above motivate the empirical strategy developed in the following section. To isolate the causal effect of the 2009 shock on GVC composition, we employ the Synthetic Control Method, which is particularly well-suited to the evaluation of singular events in a comparative case study framework.

4 Empirical Strategy and Data

4.1 The Institutional Counterfactual

It is critical to clarify that our methodology does not frame the 2009 crisis as merely an isolated political shock, but rather as a structural phase transition. Prior to 2009, Madagascar existed in a “stable corruption” equilibrium. Institutions were weak, yet they provided enough predictability to foster a nascent light manufacturing sector (e.g., Export Processing Zones under AGOA). Following 2009, the political shock transformed the nature of these institutions, shifting from centralized rent management to decentralized, chaotic predation.

Therefore, our synthetic counterfactual is explicitly designed to reflect these initial conditions. We incorporate institutional variables, such as Control of Corruption and Rule of Law from the World Governance Indicators (WGI) directly into our optimization predictors (X). By doing so, the synthetic Madagascar is not an idealized, corruption-free economy. Instead, it is a composite of developing countries that shared the exact same structural flaws and rent dependencies as Madagascar prior to 2009. Any divergence observed post-2009 thus isolates the causal effect of the *breakdown* of the institutional order, holding initial corruption and rent dependence constant.

4.2 The Synthetic Control Method

Estimating the causal effect of a given political crisis on economic growth or other related macro-variables such as global value chains is a challenging task.

For instance, relying on cross-country cross-sectional data often yields uninformative results due to pervasive coefficient biases. Two primary issues undermine the consistency of regression estimates when a measure of political instability is used as an explanatory variable. First, the absence of a consensus regarding the definition of political instability complicates global data collection. As emphasized by Haan (2007) and Jong-A-Pin (2009), such efforts are inherently prone to measurement errors, a well-documented source of bias in the coefficients. Second, papers using regression techniques face an identification problem, because of the potential endogeneity of any measure of political instability. In the presence

of unobserved heterogeneity, it is difficult to exclude that causation could go in both directions. However, even when this identification issue is addressed, the existing literature remains inconclusive as empirical studies have reported both positive and negative effects on growth, while little to no evidence exists for the potential effect on global value chains. Consequently, a case study approach is highly relevant for assessing the impact of a specific political event within a single country. The primary limitation of this framework lies in the fundamental problem of causal inference: the counterfactual scenario-what would have transpired in the absence of the shock-is inherently unobservable. Given that randomization is impossible in a macroeconomic context, researchers must rely on empirical toolkits designed to construct a credible control group (or countefactual or doppelganger). This objective closely mirrors the broader goals of the econometric literature on policy evaluation (Imbens and Wooldridge 2009). While various parametric methodologies (such as the difference-in-differences approach) and non-parametric techniques have been proposed,² our paper employs the latter. The Synthetic Control Method (SCM), originally introduced by Abadie and Gardeazabal (2003) and subsequently refined by Abadie et al. (2010) and Abadie et al. (2015), provides a highly robust empirical framework for analyzing the impact of singular case study events, such as the 2009 Malagasy political crisis.

Suppose we collect macroeconomic data for a sample of $J + 1$ countries. Within this sample, the first unit, Madagascar, experiences an unexpected shock in a specific year (namely 2009): a severe political crisis. The remaining J units do not experience this event and thus constitute the pool of potential controls, commonly referred to as the donor pool. Employing a purely data-driven methodology, the SCM constructs an optimal control group by minimizing the pre-treatment discrepancies in the outcome of interest between Madagascar and its synthetic counterpart. Specifically, this synthetic control is generated as a weighted average of the J donor units, carefully calibrated so that its pre-treatment dynamic behavior closely tracks that of Madagascar. Once this synthetic counterfactual is identified, the causal impact of the crisis is simply estimated as the post-treatment difference in outcomes between the treated unit and its synthetic control.

More formally, let X_0 be an $x \times 1$ vector whose elements correspond to the values of observed pre-treatment characteristics (or predictors) that are relevant for forecasting the variable of interest. Similarly, let x_j be an $x \times 1$ vector containing the same observable characteristics for each control country $j \in \{1, \dots, J\}$. We define X_J as the $x \times J$ matrix obtained by horizontally stacking the x_j vectors. Consequently, each row of X_J contains the values of a specific predictor across all J control units. Furthermore, let $W = (w_1, \dots, w_J)'$ be a $J \times 1$ vector of non-negative weights, such that $w_j \geq 0$ and $\sum_{j=1}^J w_j = 1$. It is worth noting that any specific vector W generates a unique synthetic control group for the Malagasy economy. The SCM derives the optimal synthetic control by identifying the weight vector W^* that minimizes the distance-typically measured as the mean squared error-between the characteristics of the treated unit (X_0) and those of the synthetic control ($X_J W$):

²For an extensive discussion on the various methods used in policy evaluation, see Hsiao and Zhou (2019).

$$W^* = \operatorname{argmin} (X_0 - X_J W)' V (X_0 - X_J W) \quad \text{subject to} \quad \sum_{j=1}^J w_j = 1, w_j \geq 0 \quad (1)$$

where V is an $x \times x$ diagonal, positive-definite matrix. Once the optimal weight vector W^* is determined-ensuring that the synthetic control closely approximates the treated unit's predictors and pre-treatment outcome trajectory-it can be used to unbiasedly estimate the counterfactual trajectory of the outcome variable had the unit not been exposed to the treatment (Abadie and Gardeazabal 2003). Crucially, by matching the extended pre-treatment trajectory of the outcome variable alongside relevant covariates, the SCM accounts for the effects of unobserved time-varying confounders. This represents a significant methodological advancement, as traditional empirical frameworks, such as difference-in-differences or standard panel fixed effects models, only control for time-invariant unobserved heterogeneity.

Given the optimization problem inherent to the Synthetic Control Method (SCM), the selection of predictors is non-trivial. Our approach aligns with established practices in the recent SCM literature Fontaine and Razafindravaosolonirina (2022). Specifically, our set of predictors comprises investment, consumption, exports, imports, government spending, residual trade, GDP growth, GDP per capita, population growth, and both backward and forward GVC participation. Data for these macroeconomic fundamentals are sourced from version 11.0 of the Penn World Table (Feenstra et al. 2015).³ Our analysis focuses on the 1996-2018 period, which corresponds to the era of economic liberalisation in Madagascar. We test the robustness of our results to these specifications in the following subsection.

To identify the causal effect of the 2009 Malagasy political crisis on global value chain participation, this SCM analysis relies on two primary identifying assumptions. The first is the Stable Unit Treatment Value Assumption (SUTVA), which posits that the treatment has no incidence on countries within the donor pool. Specifically, the political crisis should not generate direct or indirect spillovers to the control units. This assumption is likely to hold, as there is no empirical evidence of concurrent political crises in donor countries triggered by the events in Madagascar. While trade linkages in a globalized economy mean that indirect spillovers cannot be entirely ruled out, any resulting bias would likely be downward, suggesting that our estimates represent a lower bound of the crisis's true impact. Such bias is expected to be marginal, however, since the synthetic control is constructed as a weighted average of multiple units. Moreover, Madagascar's insularity inherently mitigates the risk of regional economic contagion. The second assumption stipulates the absence of anticipation effects: the 2009 crisis could not have been foreseen by domestic economic agents or control countries. Consequently, the crisis-induced impact on our outcomes of interest should only manifest after the treatment materializes. If anticipation had occurred, it would similarly lead to an underestimation of the treatment effect. Given the sudden and unexpected nature of the 2009 crisis, as well as its unforeseen duration, we are confident that this assumption remains robust.

³This database is freely available at: <https://www.rug.nl/ggdc/productivity/pwt/>.

4.3 Data

The dependent variables capturing GVC integration are sourced from the EORA-26 Multi-Region Input-Output (MRIO) database (Lenzen et al. 2013). Consistent with our theoretical framework, we distinguish two metrics. GVC backward participation is measured as the share of foreign value added in gross exports (FVA/Exports), capturing integration into contract-intensive manufacturing assembly. GVC forward participation is measured as the share of domestic value added embedded in third-country exports (DVX/Exports), capturing upstream integration dominated by primary commodity supply chains. Institutional quality is measured using two indicators from the World Bank’s World Governance Indicators (WGI) database: the Control of Corruption Estimate, which captures the extent to which public power is exercised for private gain—including elite capture and state diversion of resources—and the Rule of Law Estimate, which measures confidence in the enforceability of contracts, property rights protection, and the predictability of the legal environment. Both indicators are standardized with a mean of zero and a standard deviation of one across countries and time, facilitating cross-country comparison. Macroeconomic predictors are drawn from version 11.0 of the Penn World Table (Feenstra et al. 2015) and include consumption, investment, government expenditure, exports, imports, residual trade, GDP per capita, GDP growth, and population growth. The full sample covers the 1996–2018 period, corresponding to Madagascar’s era of economic liberalization and the availability of consistent GVC data.

4.4 Donor Pool Selection

A crucial step in the SCM framework is selecting the donor pool used to construct the synthetic counterfactual for the Malagasy economy. To this end, we follow the methodological guidelines outlined by Abadie and Gardeazabal (2003), who emphasize that units within the donor pool must share structural similarities with the treated unit. Furthermore, Abadie et al. (2015) state that “it is important to restrict the donor pool to units with characteristics similar to the treated unit. Another reason to restrict the size of the donor pool and consider only units similar to the treated unit is to avoid overfitting”. Guided by this principle, we restrict our potential donor pool to countries with a GDP per capita below US\$4,000 at the onset of the treatment (i.e., the 2009 political crisis).⁴ This data-driven threshold naturally groups Madagascar with comparable low- and middle-income economies. While we acknowledge that alternative ex ante inclusion criteria could be employed—such as restricting the sample geographically to African nations—matching on pre-treatment income levels offers a robust basis for comparison. Table 1 reports the complete list of the 45 donor countries that satisfy these conditions.

Table 1: List of countries in the donor pool

Burundi	Bangladesh	Central African Republic	Côte d’Ivoire	Cameroon
D.R. of the Congo	Djibouti	Gambia	Haiti	Kenya

⁴See also Best and Burke (2019).

Kyrgyzstan	Cambodia	Liberia	Lesotho	Madagascar
Mali	Myanmar	Mozambique	Malawi	Niger
Nepal	Rwanda	Senegal	Sierra Leone	Somalia
Sao Tome and Principe	Chad	Togo	Tajikistan	U.R. of Tanzania:
	Uganda	Zambia		

The table groups together countries that shared structural characteristics and development levels similar to Madagascar prior to 2009. A strong proportion of Sub-Saharan African countries (e.g., Senegal, Kenya, Rwanda, Côte d’Ivoire, Mali) helps control for broad regional economic trends, such as climate shocks or standard fluctuations in official development assistance across Africa. The inclusion of Asian nations and countries from other regions (e.g., Bangladesh, Cambodia, Nepal, Haiti) is crucial. Like Madagascar, these nations share a heavy historical reliance on light manufacturing (such as the textile and apparel industry) and the export of primary raw materials.

The construction of this donor pool ensures that the post-treatment divergence documented below can be attributed to the Madagascar-specific shock rather than to broader global or regional trends—including the 2008 global financial crisis—that affected low-income economies comparably during the same period.

5 Empirical Results

5.1 Pre-Treatment Match Quality

A prerequisite for a credible SCM analysis is that the synthetic control closely reproduces the pre-treatment trajectory of the treated unit. Table 2 reports the sample means of all predictors over the pre-2009 period for Madagascar, the unweighted donor pool average, and the two synthetic controls. The synthetic units closely approximate Madagascar’s pre-treatment values across macroeconomic, trade, and institutional dimensions. In particular, pre-treatment backward GVC participation for the treated unit is 13,88, compared to 13,96 for the synthetic control; the corresponding Rule of Law scores are -0,32 and -0,35, respectively. For forward GVC participation, the pre-treatment average for Madagascar is 26,64, which is closely matched by the synthetic control at 29,02. By contrast, the unweighted sample mean departs substantially from Madagascar on several dimensions, confirming that the SCM weighting procedure provides meaningful efficiency gains over simple averaging. The pre-treatment fit on institutional indicators is especially important: it ensures that the counterfactual reflects an economy with comparable governance fragilities, rather than a hypothetical corruption-free environment.

Table 2: Sample means of predictors for the pre-2009 period

	Madagascar	Sample Mean	Synthetic Madagascar	
			GVC backward	GVC forward
Consumption share	0.73	0.79	0.74	0.74

Investment share	0.11	0.15	0.17	0.13
Gov. expenditure share	0.14	0.15	0.13	0.16
Exports share	0.07	0.09	0.05	0.08
Imports share	-0.11	-0.16	-0.12	-0.19
Rental rate	0.07	-0.01	0.03	0.07
GDP per capita	1346.79	1777.34	1727.34	2686.37
GDP growth	5.23	5.51	5.81	3.17
GVC forward	26.64	31.19	29.02	26.81
GVC backward	13.88	15.61	13.96	13.30
Population growth	3.11	2.58	2.87	2.22
Control of corruption	-0.30	-0.87	-0.61	-0.39
Rule of law	-0.32	-0.92	-0.35	-0.34

Table 3 reports the country weights underlying the two synthetic controls. The synthetic Madagascar for backward GVC participation draws primarily from Tanzania (44.8%), Niger (27.7%), Senegal (18.0%), and Gambia (9.2%)—all low-income economies with comparable pre-crisis dependence on light manufacturing and primary exports. The synthetic control for forward GVC participation relies more heavily on Senegal (56.6%), Tanzania (16.2%), Tajikistan (13.9%), Gambia (6.9%), and Nepal (6.4%). The cross-regional composition of the forward-linkage donor weights is consistent with the identification of economies sharing Madagascar’s structural dependence on primary commodity exports, irrespective of geography. The dominance of Sub-Saharan African countries in both donor sets helps absorb regional trends common to the continent—such as aid flow fluctuations and climate-related agricultural shocks—that might otherwise confound the post-treatment comparison.

Table 3: Main countries contributors of synthetic Madagascar

GVC backward		GVC forward	
Weights	Country	Weights	Country
0.448	U.R. of Tanzania: Mainland	0.765	Senegal
0.277	Niger	0.235	Tajikistan
0.180	Senegal		
0.092	Gambia		

5.2 Estimated Post-Treatment Divergence

Figure 3 presents the main SCM results for backward and forward GVC participation. The upper panels plot the trajectories of observed Madagascar against its respective synthetic counterfactual; the lower panels display the implied gaps.

For backward GVC participation, the two trajectories track each other closely over the pre-treatment period, which supports the validity of the counterfactual. Following the 2009 crisis, a persistent and widening negative divergence emerges. The estimated gap

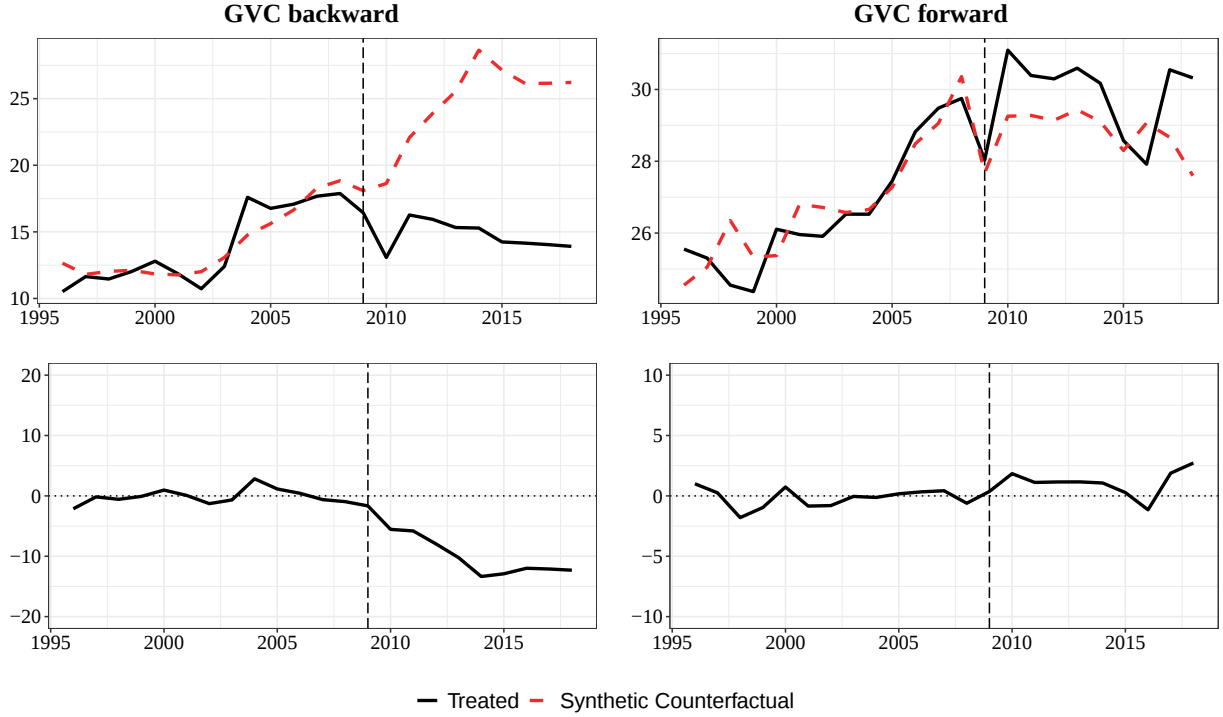


Figure 3: Main results of the Synthetic Control Method : Observed Madagascar vs. counterfactual

reaches approximately -12 percentage points by the end of the sample period, indicating that Madagascar’s backward integration in 2018 was substantially lower than what would have been expected in the absence of the political shock. This result is consistent with the institutional filter hypothesis: the abrupt loss of AGOA eligibility and the collapse in legal predictability disproportionately affected contract-intensive assembly industries, which require stable logistics networks, enforceable supplier contracts, and predictable trade policy to maintain narrow profit margins.

For forward GVC participation, the post-treatment pattern reveals an absence of significant effect. Madagascar’s observed trajectory does not diverge substantially and significantly from its synthetic counterfactual from 2009 onward. This lack of divergence suggests that resource-seeking activities, anchored by large sunk costs and less sensitive to contractual frictions, were effectively insulated from the institutional deterioration that followed the crisis. Taken together, the two panels document an asymmetric structural reallocation: a contraction of backward linkages alongside a relative resilience of forward linkages, which is the defining empirical signature of the institutional filter mechanism proposed in Section 3.

5.3 Robustness Checks: Placebo Tests

To assess whether the estimated divergences are statistically unusual relative to the donor pool, we implement standard in-space placebo exercises following Abadie et al. (2010). The SCM algorithm is applied iteratively to each donor country as if it had been treated in 2009, holding all other parameters constant. The resulting distribution of placebo gaps

provides a non-parametric benchmark against which Madagascar's estimated effect can be assessed.

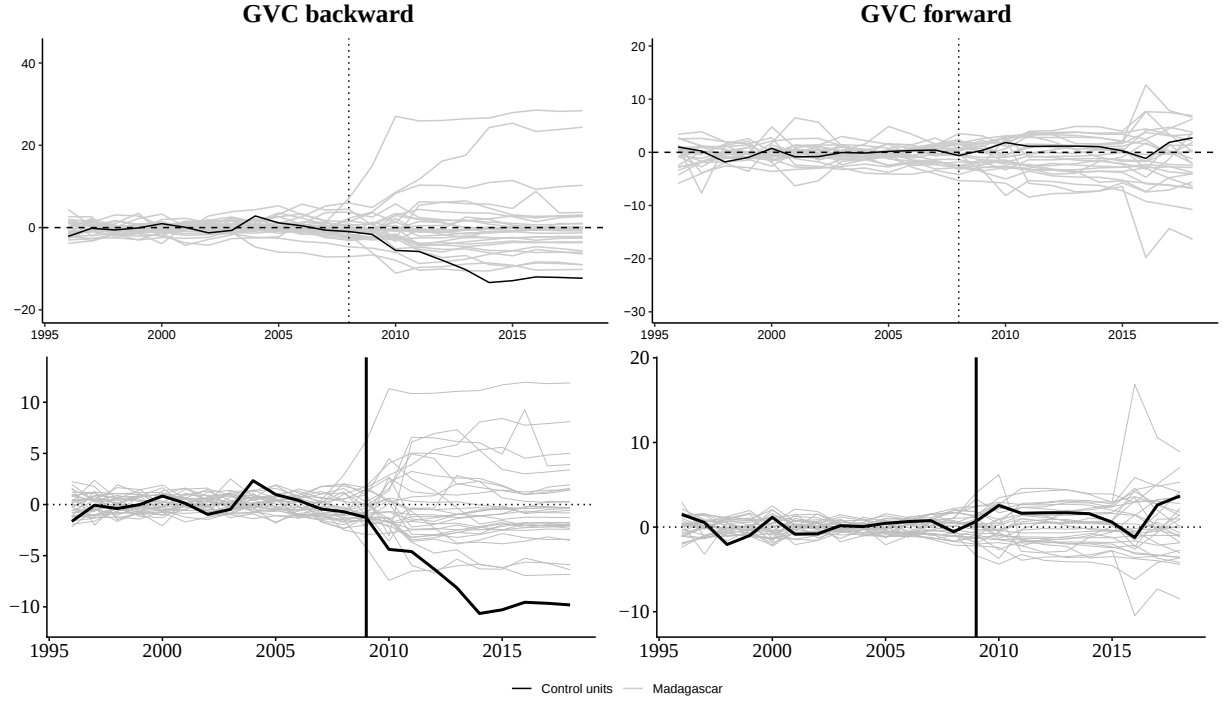


Figure 4: Placebo experiments

Figure 4 plots all placebo gap trajectories alongside Madagascar's estimated gap. For backward GVC participation, Madagascar's post-2009 trajectory lies at or near the lower bound of the placebo distribution from 2009 onward, indicating that the estimated negative gap is large relative to the variation observed across donor countries. For forward participation, the positive divergence is smaller in magnitude, consistent with a weaker but still directionally distinct effect.

Figure 5 formalizes this assessment by reporting the ratio of post-treatment to pre-treatment Root Mean Square Prediction Error (RMSPE) for all units. A high ratio indicates that the post-treatment divergence is large relative to the pre-treatment fit, providing a measure of the treatment effect that is not mechanically driven by poor pre-treatment matching.

For backward GVC participation, Madagascar's post/pre-treatment RMSPE ratio ranks among the highest in the donor pool, suggesting that its post-2009 decline is unlikely to be attributable to chance or to pre-existing poor fit. The result is somewhat less pronounced for forward participation, consistent with the more modest magnitude of the estimated forward gap. Taken together, the placebo exercises support the interpretation that the post-2009 divergences documented in Figure 3 reflect a genuine structural break rather than a statistical artifact.

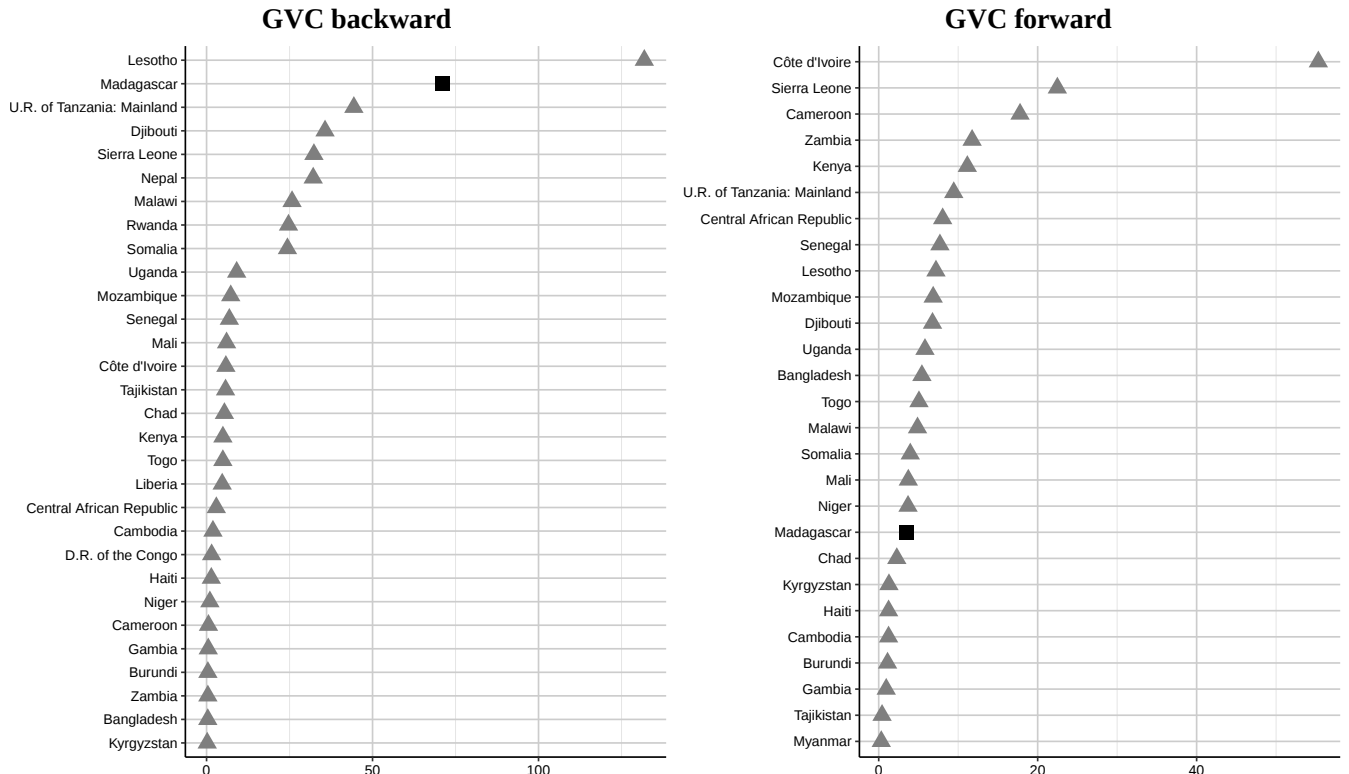


Figure 5: Relative measures of the post- to pre-treatment mean square prediction error for all donor countries

6 Mechanism Evidence: Institutional Deterioration after 2009

The institutional filter hypothesis posits that the 2009 crisis affected GVC composition primarily through two channels: a deterioration of contractual security (Rule of Law) that made contract-intensive manufacturing untenable, and a strengthening of rent-seeking dynamics (Control of Corruption) that entrenched extractive forward linkages. To assess these channels directly, we apply the SCM framework to both institutional indicators as outcome variables, constructing separate synthetic counterfactuals that reflect what Madagascar's governance trajectory would have been, conditional on its pre-crisis institutional and structural characteristics.

6.1 Pre-Treatment Institutional Fit

Table 4 reports pre-treatment predictor means for the institutional outcome SCM exercises. The synthetic controls replicate Madagascar's pre-2009 governance scores with high fidelity. In particular, the Rule of Law score for observed Madagascar in the pre-treatment period is -0,32, while the synthetic counterpart is -0,43 (whith CC) —a discrepancy that is small relative to the post-treatment divergence reported below. The unweighted sample mean, by contrast, deviates substantially from Madagascar's actual governance level, confirming that the weighting procedure identifies a structurally comparable comparator rather than a

generic low-income benchmark. Table 5 shows that the institutional synthetic controls draw primarily on Senegal (which accounts for approximately 57–60% of the two counterfactuals), supplemented by Rwanda, Gambia, Tanzania, and Tajikistan—all economies that shared Madagascar’s pre-crisis governance profile while experiencing broadly stable institutional trajectories after 2009.

Table 4: Sample means of predictors for the pre-2009 period

	Madagascar	Sample Mean	Synthetic Madagascar	
			Control of corruption	Rule of law
Consumption share	0.73	0.79	0.80	0.77
Investment share	0.11	0.15	0.14	0.14
Gov. expenditure share	0.14	0.15	0.14	0.15
Exports share	0.07	0.09	0.05	0.06
Imports share	-0.11	-0.16	-0.14	-0.17
Rental rate	0.07	-0.01	0.02	0.06
GDP per capita	1346.79	1777.34	2115.24	2604.85
GDP growth	5.23	5.51	6.24	3.82
GVC forward	26.64	31.19	33.43	29.13
GVC backward	13.88	15.61	14.91	15.78
Population growth	3.11	2.58	3.14	2.55
Control of corruption	-0.30	-0.87	-0.32	-0.37
Rule of law	-0.32	-0.92	-0.43	-0.32

6.2 Estimated Institutional Divergence

Figure 6 presents the SCM results for Control of Corruption and Rule of Law. As with the GVC outcomes, the synthetic and observed trajectories track each other closely over the pre-treatment period, supporting the validity of the institutional counterfactuals.

Table 5: Main countries contributors of synthetic Madagascar for institutional variables

Control of corruption		Rule of law	
Weights	Country	Weights	Country
0.565	Senegal	0.600	Senegal
0.358	Rwanda	0.185	Gambia
0.077	U.R. of Tanzania: Mainland	0.131	Tajikistan
		0.081	Rwanda

Following 2009, both indicators diverge persistently and negatively from their synthetic benchmarks. For Control of Corruption, the estimated gap widens continuously over the post-treatment period, reaching approximately -1.0 by the end of the sample. For Rule of Law, the estimated gap settles at approximately -0.5 by the mid-2010s, with no evidence

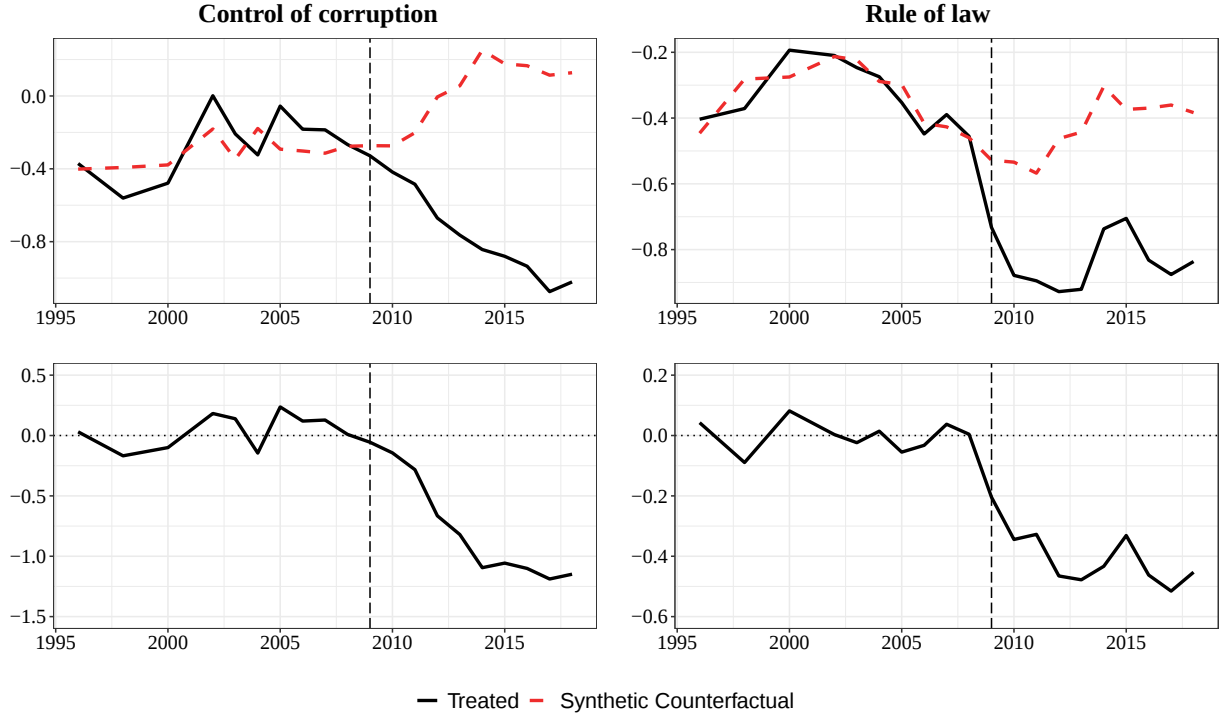


Figure 6: Main results of the Synthetic Control Method for institutional variables: Observed Madagascar vs. counterfactual

of recovery within the sample window. These patterns are consistent with the account provided in Section 2: the prolonged transitional governance period (2009–2013) was associated with a weakening of formal legal institutions and a strengthening of informal elite capture mechanisms, neither of which reversed substantially following the restoration of constitutional order. This institutional persistence is consistent with the hysteresis observed in the GVC outcomes.

The co-movement between institutional deterioration and GVC reallocation is consistent with the transmission mechanism proposed in the theoretical framework: a deterioration in Rule of Law raises the contractual transaction costs faced by manufacturing assemblers—consistent with the collapse in backward participation—while a deterioration in Control of Corruption strengthens elite incentives to channel rents toward the extractive sector, consistent with the relative resilience of forward participation. We do not claim to formally identify these channels, but the directional patterns across outcomes are coherent with the institutional filter interpretation.⁵

⁵Ideally, the exact causal transmission of the institutional filter—specifically the firm-level exit of contract-intensive assemblers versus the retention of resource-seeking firms—would be identified using continuous, firm-level panel data or transaction-level customs records. However, in the context of Madagascar, the absence of longitudinal firm censuses spanning the pre- and post-2009 periods, compounded by the massive shift toward informality following the crisis, precludes a robust microeconomic identification. Consequently, our reliance on harmonized aggregate MRIO data and the macro-structural SCM framework represents the most rigorous available strategy to capture the net sectoral reallocation effect over a long time horizon, providing macro-level evidence that is strongly consistent with our micro-founded theoretical predictions.

6.3 Robustness of Institutional Results

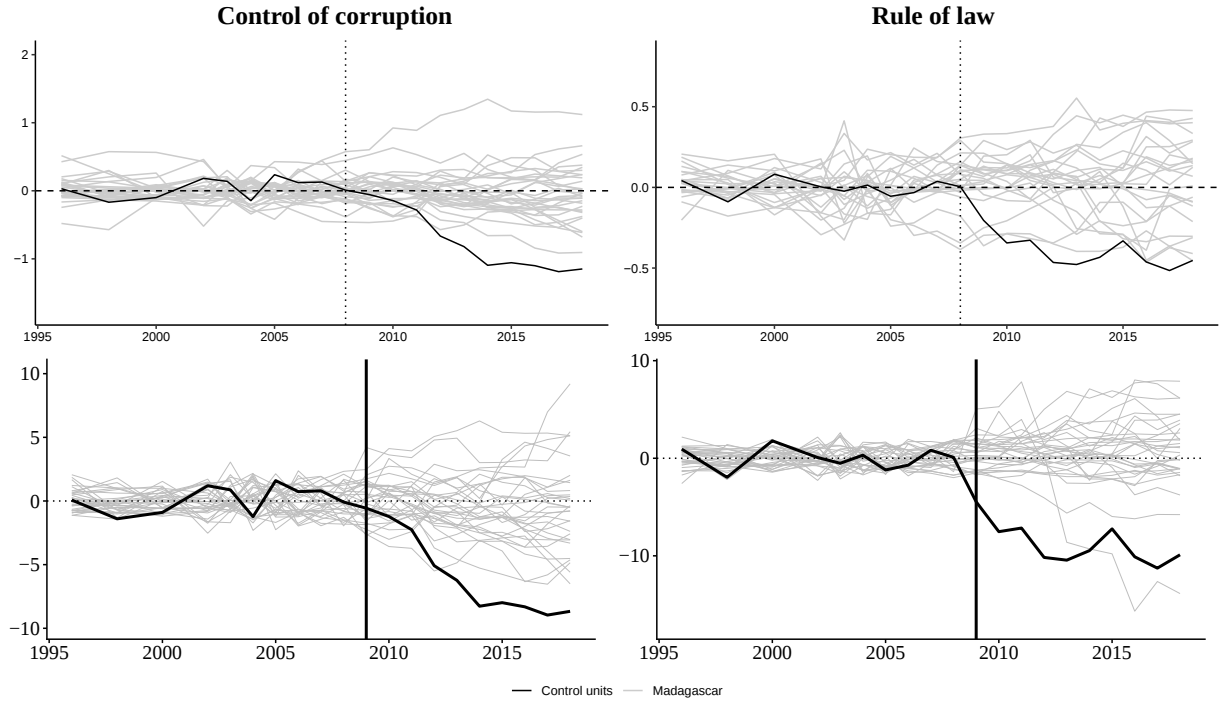


Figure 7: Placebo experiments for institutional variables

Figure 7 and Figure 8 report in-space placebo tests and RMSPE ratios for the institutional outcomes. For Control of Corruption, Madagascar's post-treatment trajectory lies well below the distribution of placebo gaps, and its post/pre-treatment RMSPE ratio ranks highest among all donor countries—indicating that the estimated deterioration is unusually large relative to the cross-country benchmark. For Rule of Law, the estimated gap is smaller in magnitude, and Madagascar's RMSPE ratio ranks second in the donor pool. While a rank of second does not provide the same degree of statistical rarity as a rank of first, it remains consistent with an economically meaningful and unusual institutional disruption. Taken together, these results support the interpretation that the post-2009 governance deterioration in Madagascar was both quantitatively large and statistically uncommon relative to comparable low-income economies over the same period.

7 Conclusion

This paper examines how political instability affects the composition of global value chain integration in a low-income economy. Using Madagascar's 2009 unconstitutional change of government as a quasi-natural experiment and applying the Synthetic Control Method to data covering 1996–2018, we find that the political shock is associated with a large and persistent decline in backward GVC participation—the component most sensitive to contractual security and logistics predictability—alongside a smaller but sustained positive divergence in forward participation, which is more closely linked to primary commodity exports. Supplementary exercises document a concurrent deterioration in Rule of Law

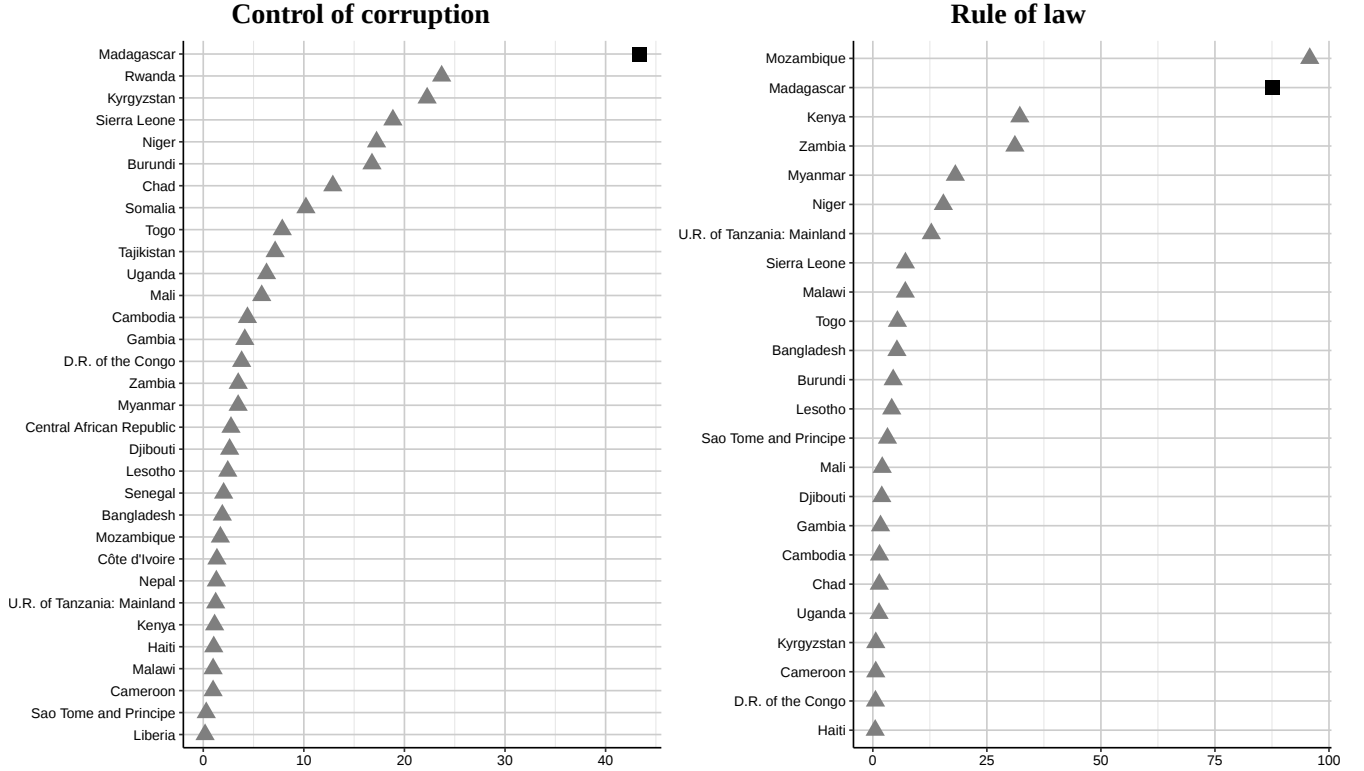


Figure 8: Relative measures of the post- to pre-treatment mean square prediction error for all donor countries for institutional variables

and Control of Corruption relative to the synthetic counterfactual. In-space placebo tests indicate that these patterns are unlikely to be driven by chance or by pre-existing structural differences.

These results offer three main contributions to the development economics literature. First, they provide evidence that political instability restructures trade composition, not merely aggregate trade volumes—a distinction with profound implications for structural transformation trajectories. Second, we formally ground the “institutional filter” mechanism within the theory of incomplete contracts. By demonstrating how an abrupt political shock exacerbates the hold-up risk, we show that institutional degradation acts as an asymmetric implicit tax. It disproportionately drives out efficiency-seeking investments in contract-intensive backward activities, while leaving resource-seeking forward activities, anchored by massive sunk costs, comparatively intact. Third, we demonstrate that initial institutional quality must be held constant when constructing the counterfactual; a synthetic comparator that ignores pre-crisis governance fragilities would misattribute the observed divergence to the shock rather than to pre-existing structural weaknesses.

Future research could extend this analysis in several directions. First, firm-level or sector-level data, where available, would allow a more precise identification of the contractual intensity channel. Second, a multi-country comparative analysis of unconstitutional changes of government using a staggered SCM design could assess the external validity of the institutional filter mechanism beyond the Malagasy case. Third, the interaction between trade preference architecture—such as AGOA-type agreements—and institutional fragility

merits systematic empirical investigation, given the widespread reliance of low-income economies on such instruments as a GVC entry mechanism.

The policy implications extend far beyond Madagascar. Countries seeking to integrate into manufacturing-intensive GVC segments face a fundamental prerequisite that industrial or fiscal incentives alone cannot substitute for: the legal predictability and contract enforceability required to mitigate supplier hold-up risks. Trade preferences such as AGOA can provide a temporary scaffold for nascent manufacturing, but their effects are highly vulnerable if the underlying institutional environment cannot guarantee political continuity. The Malagasy case suggests that a single, sufficiently severe institutional disruption can permanently reconfigure an economy's international integration toward a rent-dependent equilibrium, even if formal democratic institutions are eventually restored.

While this case focuses on Madagascar, a crucial next step in our research agenda will consist of generalizing this result via a broader, multi-country analysis to test the external validity of the institutional filter across different stages of economic development.

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Appendix A : SCM for GDP per capita

Figure 9 presents the SCM results for GDP per capita as an additional validation exercise. The pre-treatment fit is satisfactory, and a negative post-2009 gap is visible, consistent with the aggregate growth cost of the political crisis documented in the existing literature (Fontaine and Razafindravaosolonirina 2022). The magnitude of the GDP per capita gap is substantially smaller than the backward GVC gap in relative terms, suggesting that the structural reallocation effect identified in the main results is not simply a reflection of the aggregate output loss.

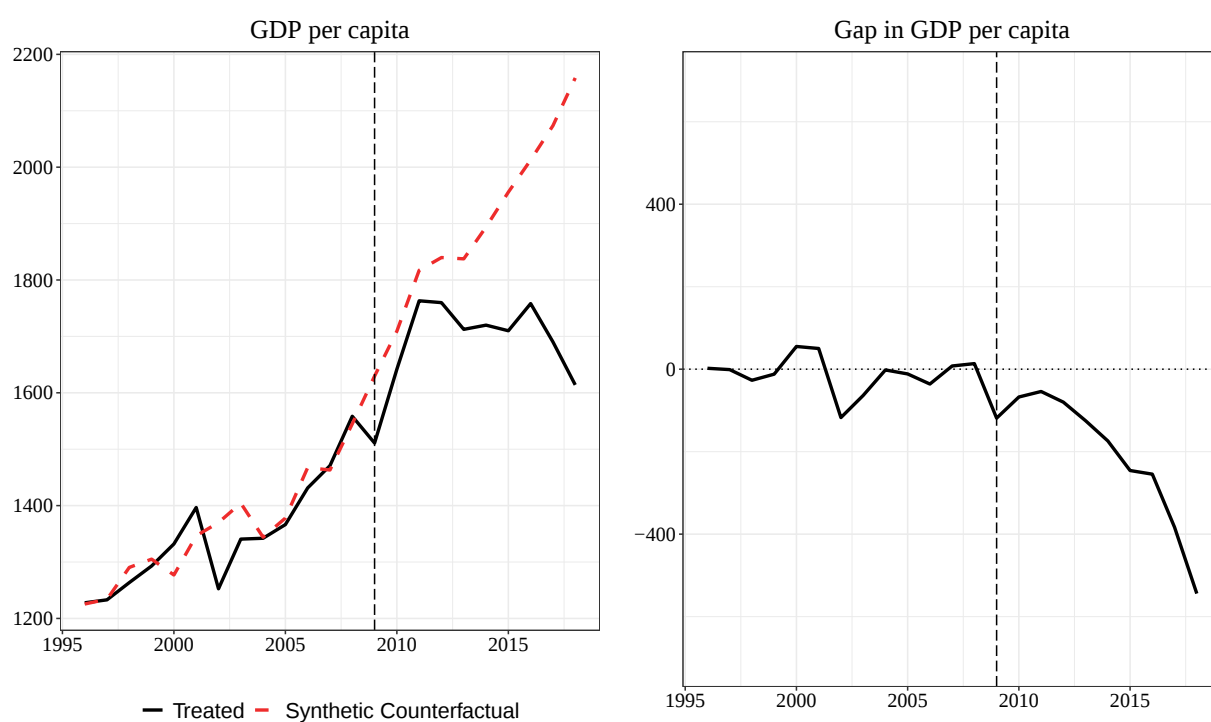


Figure 9: Results of the Synthetic Control Method for GDP per capita : Observed Madagascar vs. counterfactual