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Forging Strength: Exploring the Dynamic Interplay between Institutions and State Capacity

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Forging Strength: Exploring the Dynamic Interplay between Institutions and State Capacity

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ABSTRACT: This paper examines the distinct and interactive effects of state capacity (SC) and institutional quality (IN) on real GDP per capita growth across up to 130 countries over the period 1970–2022. Using a novel identification strategy that isolates large, exogenous governance shocks via both residual-based and percentile-based approaches, we estimate dynamic responses using local projections. We find that SC and IN shocks yield positive and persistent growth effects, particularly in emerging and developing economies, where governance gaps are most binding. Institutional reforms generate the strongest gains. In contrast, SC shocks show weaker effects on average, though they become highly effective when implemented alongside institutional improvements, highlighting a strong complementarity. Results are robust to alternative shock definitions and endogeneity concerns. A two-stage least squares (2SLS) approach using income-group-based democratization waves and natural disasters as instruments confirms the validity of our shocks, with IV estimates closely tracking the baseline, except for government effectiveness (GEE) shocks, where the IV point estimate is significantly larger. These findings suggest that endogeneity is not a major concern, and underscore that targeted institutional reforms, particularly when supported by capable state structures, can deliver substantial economic dividends.

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WORKING PAPERS

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I. Introduction

The idea that institutions shape economic outcomes is not new. More than a century ago, Max Weber argued that bureaucratic organization and the Protestant work ethic played a fundamental role in economic success, highlighting how social structures influence development (Greif, 2006). Yet, despite these early insights, mainstream economics largely ignored institutions for much of the 20th century, treating growth as a function of capital accumulation and technological progress (Solow, 1956). It was only in the latter half of the century that institutional economics gained real traction, driven by the work of North (1990) and his co-authors (North and Thomas, 1973; North and Weingast, 1989). Their research fundamentally changed the conversation, showing that institutions are not just background conditions but the very rules that determine economic performance.

From this perspective, institutions are the foundation upon which economies rise or fall. As North (1991) emphasized, they establish the “rules of the game”, shaping incentives, structuring interactions, and ultimately determining economic performance. Without strong institutions, markets fail to function efficiently, investments dry up, and growth stagnates. The collapse of communism and the chaotic transition to capitalism offered a stark reminder of this reality. Countries with weak institutional frameworks struggled to establish functioning market economies, while those that built robust institutions found a path to sustained growth (see Roland, 2004). Empirical evidence also leaves little doubt: cross-country analyses consistently show that institutional differences, ranging from secure property rights to an independent judiciary and corruption controls, drive divergent economic trajectories (see Acemoglu and others, 2001).

At the heart of this literature is a simple but powerful insight: institutions determine who has power, how that power is exercised, and whether economic gains are broadly shared or captured by the elites. Strong institutions reduce transaction costs, enforce property rights, and create a predictable environment that fosters investment and innovation. More importantly, they shape long-term economic and political stability by preventing the entrenchment of extractive structures that hinder growth. Without them, resources are squandered, markets falter, and development remains elusive (see Temple, 1999).

State capacity, defined asthe ability of a government to collect taxes, enforce laws, and provide public goods, is another crucial determinant of economic success, and is about “playing the game”. Yet, compared to institutions, it has received relatively little attention in the economics literature (Fukuyama, 2004). This neglect was partly due to the dominant focus among social scientists on constraining government power rather than building the capacity necessary for states to perform their fundamental roles (see Imam and Temple, 2024; Savoia and Sen, 2012). Only more recently, with better data and a clearer view of historical patterns, have economists begun to recognize the centrality of state capacity in shaping development trajectories (see Ogilvie, 2022).

The key turning point came with the recognition that state capacity is not about the size of government but about its quality and effectiveness. During the 1980s, scholars studying East Asian economic success challenged conventional wisdom by showing that states could play an active role in development without necessarily expanding their footprint. Johnson (1982) described Japan’s developmental state, which, despite limited government spending relative to

GDP, played a decisive role in industrial transformation (see also Amsden, 1989; Wade, 1990). Unlike interventionist states that stifled growth, East Asian states used their capacity to enhance market efficiency and enforce policies that fostered investment and innovation (see Skocpol, 1985). This shift in perspective reshaped how economists thought about the relationship between the state and economic development.

The concept itself is not new. Scholars like Charles Tilly (1990) long argued that state formation was driven by war-making and the need for protection. But for decades, economic analysis failed to systematically incorporate state capacity as a variable influencing growth. That changed when researchers began to show how weak states—unable to enforce property rights, regulate markets, or provide essential services—lead to stagnation, while strong states create the conditions for prosperity (see Johnson and Koyama, 2017). The lesson is clear: it is not just the presence of institutions that matters, but the ability of the state to make them work.

State capacity has been conceptualized in different ways, but the core idea remains the same: a strong state is one that can implement policies effectively, enforce laws, and shape economic and social outcomes. Mann (1986) introduced the concept of the state's "infrastructural power," highlighting its ability to penetrate civil society and execute decisions across its territory. [1]Others have broken down state capacity into extraction, coordination, and compliance (Berwick and Christia, 2018) or emphasized the role of bureaucratic quality in shaping broader state capacity (Besley et al., 2009).

More recent work formalized these insights. Besley and Persson (2010) demonstrated that investment in state capacity, through effective taxation and contract enforcement, can directly drive economic growth by improving public goods provision. The logic is that states with high capacity build better infrastructure, provide quality education and healthcare, and ensure that economic policies are actually implemented. A state that can collect taxes effectively can reinvest in development and respond to economic crises, while one that cannot risks stagnation. Empirical research has since expanded on these ideas, exploring how state capacity influences fiscal policy, economic stability, and long-term development outcomes (see, Dinecco and Wang, 2024).

The lesson is clear: it is not just institutions that matter, but the ability of the state to make them work. States with weak capacity struggle with instability, insecure property rights, and ineffective governance, conditions that trap nations in cycles of low growth and political disorder. In contrast, those that build strong institutions and an effective state lay the foundation for sustained economic success.

While both institutions and state capacity are essential for development, they operate through distinct mechanisms (see Table 1). Institutions establish the rules of the game, shaping incentives, guiding economic transactions, and creating an environment conducive to growth (see Acemoglu and Robinson, 2009, 2012). State capacity, on the other hand, determines whether those rules are enforced. It reflects the state's ability to implement policies, provide

[1] Fukuyama (2011, 2014) distinguished between state effectiveness, the rule of law, and democratic accountability—closely aligning with the executive, judiciary, and legislature in most countries.

public goods, and maintain order, influencing economic outcomes in a more direct and immediate way (see Dinecco and Katz, 2016).

Table 1: Comparison of Institutions and State Capacity

	Institutions	State Capacity
Definition	Formal and informal rules, norms, and organizations that structure societal interactions.	The ability of a government to implement policies, enforce laws, and provide public goods and services.
Scope	Broader: includes both formal systems (laws, constitutions) and informal systems (norms, traditions).	Narrower: focuses on the operational effectiveness of the state.
Origins	Evolve over time through historical, cultural, and	Built through investments in bureaucracy,
Functions	- Provide stability and predictability. - Define rules of behavior. - Allocate power and resources. - Resolve conflicts. - Shape incentives for individuals and organizations.	- Implement policies and laws. - Deliver public services (e.g., healthcare, - Maintain order and security. - Mobilize resources (e.g., taxation). - Respond to crises (e.g., natural disasters, pandemics).
Examples	- Formal: Constitutions, legal systems, parliaments, central banks. - Informal: Social trust, cultural norms, informal	- Tax collection systems. - Police and military forces. - Public healthcare and education systems. - Disaster response mechanisms.
Measurement	- Quality of rule of law. - Level of corruption. - Strength of property rights. - Degree of political accountability. - Social trust and cohesion.	- Efficiency of tax collection. - Quality of public service delivery. - Ability to maintain law and order. - Speed and effectiveness of crisis response. - Bureaucratic competence.
Impact on Development	Institutions shape long-term economic and political outcomes by influencing incentives, investment, and innovation.	State capacity determines the government's ability to implement development policies, maintain stability, and provide essential services.
Challenges	- Institutional decay (e.g., corruption, erosion of rule of law). - Resistance to change (e.g., entrenched informal norms). - Misalignment between formal and informal	- Weak administrative systems. - Lack of resources or expertise. - Political interference or lack of legitimacy. - Overreach or authoritarianism.
Examples in Practice	Strong institutions: Denmark's transparent governance	High state capacity: South Korea's efficient bureaucracy.

Source: Authors'

Institutions tend to be more static, setting long-term constraints on political and economic actors. State capacity is dynamic, evolving as governments respond to challenges, mobilize resources, and execute policies. But a strong state is not always a force for progress. As Acemoglu and Robinson (2019) and Ogilvie (2022) argue, high state capacity can also serve despotic regimes, entrenching elite control, repressing opposition, and stifling economic dynamism. The same institutions that enable effective governance can also be used to consolidate power at the expense of broader development.

Despite their differences, institutions and state capacity are often treated interchangeably in the economic literature, obscuring their distinct roles (see North and others, 2009). Institutions create the framework for market efficiency, investment, and innovation. State capacity ensures that policies are enforced and public goods are delivered. Development depends on both but understanding how they interact, and when they come into conflict, is critical to explaining why some states succeed while others fail.[2] High-quality institutions reduce transaction costs and create predictable market conditions that can attract investment and spur innovation. Similarly, a strong state capacity ensures that reforms are not only legislated but also executed efficiently, effectively administered, adhered to and maintained over time, thereby enhancing their impact on economic development. For example, reforms aimed at deregulating industries or privatizing state-owned enterprises require robust legal systems and regulatory frameworks to prevent market failures and ensure fair competition. Likewise, reforms in tax policy need effective administrative mechanisms to prevent evasion and ensure compliance.[3]

In countries where state capacity is robust, reforms aimed at improving market mechanisms or enhancing public infrastructure are more likely to succeed because the state can efficiently mobilize resources, manage implementation, and ensure compliance. Conversely, in environments where state capacity is weak, even well-designed reforms may falter, as the governmental structures necessary to enforce and sustain these changes are insufficient. Therefore, assessing and enhancing state capacity is vital for the success of structural reforms, as it directly influences their implementation and the overall trajectory of economic development. Without the support of strong institutions and capable governance, such reforms could lead to instability, corruption, or economic inefficiencies. Therefore, in planning and implementing structural reforms, policymakers must consider both the strength of institutions and the capacity of the state to support these changes. Enhancing institutional quality and building state capacity are, thus, not only beneficial, but are critical preconditions for the success of structural reforms in driving meaningful economic development.

In this paper, we examine the impact of major changes in state capacity (SC) and institutional quality (IN) on real GDP per capita growth across up to 130 countries from 1970 to 2022 We use the local projections (LP) approach of Jordà (2005) to estimate the dynamic effects of governance shocks over the short and medium term. This flexible method allows us to model the evolution of output following large changes in governance without imposing strong dynamic restrictions. We explore the effects of SC and IN shocks separately, interactively, and conditionally, accounting for the pre-existing level of the complementary governance dimension. We operationalize SC using the Hanson and Sigman (2021) state capacity index,which is only available through 2015.while institutional quality is captured through two distinct V-Dem indicators: Government Effectiveness (GEE) and Political and Civil Liberties (PRCL), both of which extend through 2022. However, for consistency in the panel structure and shock

[2] In the context of economic development, the need for structural reforms is deeply intertwined with the quality of institutions and the level of state capacity. Structural reforms, which may include changes in fiscal policy, regulation in product markets, judicial systems, and labor markets, aim to improve economic efficiency and promote sustainable growth. Governments introduce reforms because they expect certain benefits like enhanced growth (see de Haan and Wiese, 2022 for a discussion of the literature and new evidence). Often, structural reforms aim to reduce unemployment (Parlevliet and others, 2018; Bassanini and Duval, 2009). Structural reforms may also affect business cycles and inflation dynamics. Several studies have examined these in more detail. However, their success largely depends on the underlying institutional framework and the capability of the state to enforce and manage these changes. This relationship has become increasingly central to economic discourse.

[3] For instance, Zanetti (2011) and Gnocchi and others (2015) examine the effect of reform of labor market institutions on business cycle fluctuations. Thomas and Zanetti (2009) study the effect of labor market reform on price stability, while Campolmi and Faia (2011) link labor market structures, unemployment insurance in particular, to inflation differentials in the euro area.

identification—particularly in specifications that combine SC and IN or use their interaction—we restrict the sample to end in 2015. These measures represent different but complementary aspects of governance performance. For identification, we construct two types of shocks: (i) residual-based shocks, which isolate large, unexpected changes in governance indicators after controlling for their autoregressive dynamics and global trends, and (ii) percentile-based (differenced) shocks, which capture unusually large annual improvements, specifically those in the top decile of a country's own historical distribution. In the case of these continuous shocks, LP coefficients are scaled by the average magnitude of the governance change to express the results in terms of a typical large institutional shift.

This paper offers four main contributions. First, we draw a clear empirical distinction between the roles of state capacity and institutional quality in shaping growth trajectories, in contrast to much of the prior literature that treats them as conceptually interchangeable. Second, we estimate the short- to medium-term effects of major governance improvements, allowing us to capture both transitional adjustment costs and the early benefits of reform. Third, we address endogeneity concerns by introducing external instruments. For SC shocks, we use natural disasters with high fatality rates as exogenous triggers of state-building episodes. For institutional quality shocks, we instrument GEE and PRCL changes with average annual changes in Polity2 scores among countries within the same IMF income group (excluding the target country), exploiting regional institutional diffusion and democratization momentum. Fourth, we examine nonlinearities and complementarity between SC and IN: we assess whether the growth effects of a shock in one dimension depend on the level of the other.

Our findings show that shocks to both SC and institutional quality have significant and persistent positive effects on real GDP per capita growth, particularly in emerging and developing economies. GEE and PRCL improvements are especially powerful drivers of growth, while SC shocks tend to be more effective when supported by strong institutions. We uncover robust complementarity between the two governance dimensions, with improvements in one magnifying the effect of the other. Across robustness checks, including alternative shock definitions, model specifications, and data sources, our main results hold. Importantly, IV estimates are generally consistent with baseline findings, suggesting limited bias from endogeneity. However, for GEE shocks, the IV estimates are statistically larger than the baseline, suggesting that attenuation bias may understate their full impact. These results highlight the value of institutional reforms, particularly those enhancing government effectiveness, when paired with sufficient administrative and implementation capacity. They offer clear guidance for tailoring governance reform strategies to different development contexts.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and positions our study within the broader research on state capacity, institutions, and economic growth. Section 3 discusses the data sources and construction of key variables, providing descriptive statistics and justifications for our empirical choices. Section 4 outlines the theoretical framework underpinning our analysis. Section 5 elaborates on the methodological approach, detailing the local projections (LP) framework and steps to address endogeneity concerns. Section 6 presents the main results and conducts several robustness checks, including alternative variable definitions and specifications. The final section concludes by summarizing the findings, discussing policy implications, and suggesting avenues for future research.

II. Dissecting the Interaction Between Institutional Quality and State Capacity in the Reform Agenda

While institutions and state capacity have each been analyzed individually in economic research, their interaction and co-movement remain underexplored. Effective institutions, characterized by transparency, reduced corruption, and enhanced accountability, can strengthen state capacity by improving the enforcement of property rights and contract law, which are key foundations of economic stability and growth (North, 1990; Mauro, 1995). Conversely, a high-capacity state, marked by efficient tax systems, robust legal enforcement, and reliable public service delivery, can bolster institutions by supporting effective regulation, reducing uncertainty, and upholding law and order (Besley and Persson, 2010; Acemoglu and others, 2001). This dynamic suggests a bidirectional relationship, where improvements in one domain can reinforce the other, potentially creating a virtuous cycle that promotes good governance and development (see Figure 1). In other words, high-quality institutions and strong state capacity reinforce each other. The synergy between institutional quality and state capacity often results in a positive correlation, as both are integral to the effective functioning of a state (Evans and Rauch, 1999; Rodrik, 2004).

The strong correlation between state capacity and institutions in Figure 1.c raises a natural concern: could multicollinearity distort our estimates when both variables enter the regression together? At first glance, this seems plausible. However, a closer look at the Variance Inflation Factor (VIF) analysis suggests otherwise. For the raw variables, the mean VIF remains below 6, well within standard thresholds, indicating that multicollinearity is not a source of concern. More importantly, for the shock-based specifications in the Local Projections (LP) approach, the mean VIF is close to 1, suggesting virtually no multicollinearity in these cases. To ensure robustness, we take a dual approach: analyzing state capacity and institutions both separately and jointly. Moreover, by including interaction terms in select specifications, we capture the interplay between these variables without inflating multicollinearity risks. In other words, while state capacity and institutions are closely linked, their effects can be disentangled without compromising statistical validity.

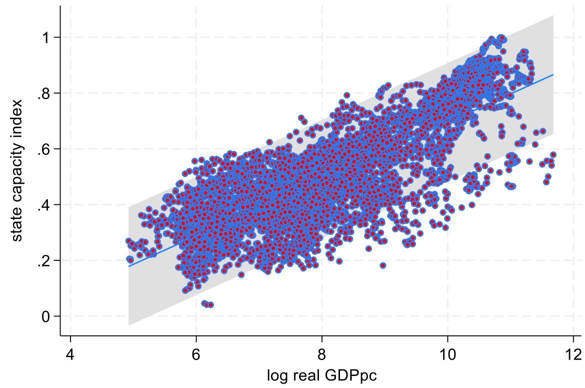
Robust institutions are essential for building and sustaining state capacity. By enforcing transparency and accountability, they ensure that state power is exercised within a legal and regulatory framework, directing administrative efforts toward economically sound and contextually feasible reforms (Evans and Rauch, 1999).

However, institutions alone do not guarantee effective governance. State capacity is crucial for translating institutional frameworks into action, ensuring that policies are not just well-designed but also consistently implemented and enforced. The role of state capacity in enforcing legal frameworks is well established. Without the ability to implement policies effectively, even the best institutional frameworks remain ineffective (Besley and Persson, 2010). Yet, enforcement alone is not enough. Institutions lend legitimacy to these policies by fostering public trust and transparency, increasing compliance and reducing resistance to reform (North, 1990).

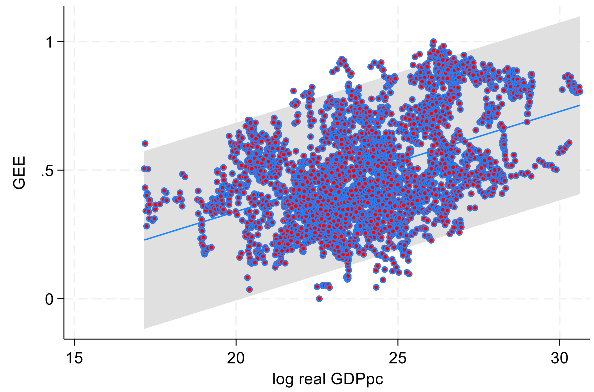
Moreover, strong institutions curb corruption and undue influence, creating an environment where reforms are implemented equitably rather than captured by elites (Mauro, 1995).

Figure 1. Unconditional correlation between normalized state capacity, institutions and real GDP growth per capita, 1970-2015

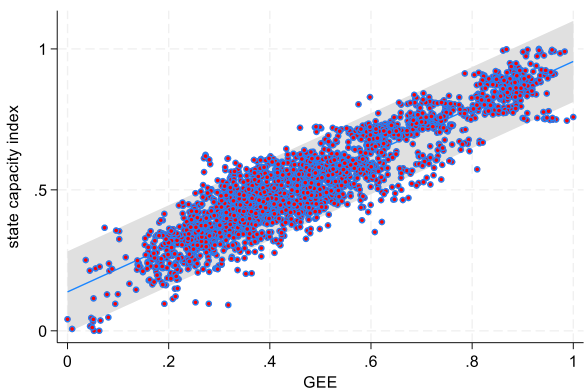
a. State capacity and real GDP pc



b. Institutions and real GDP pc



c. State Capacity and Institutions



Note: Unconditional bivariate correlations. Shaded grey areas denote 95 percent confidence with the blue continuous line denoting the linear fit.

While the relationship between state capacity and institutional quality is mutually reinforcing, its strength and nature vary depending on historical legacies, levels of development, political systems, and external influences. Historical trajectories also matter. Governance structures in post-colonial states, for instance, are often shaped by their colonial past, affecting both state capacity and institutional evolution (North and others, 2009). Similarly, economic development influences this dynamic, with developed economies tending to benefit from a positive feedback loop, where strong institutions enhance state capacity, which in turn reinforces institutional quality (Acemoglu and Robinson, 2012). In short, institutions provide the rules of the game, but without state capacity, those rules remain aspirational rather than operational. The two must evolve together—where one lags, governance weakens, and reform efforts falter.

In some cases, strong state capacity can temporarily offset weak institutions, allowing effective implementation of reforms in the short term, even when institutional structures are underdeveloped. However, such arrangements are typically unsustainable without long-term institutional improvements, as Evans (1995) and Rodrik (2004) point out, because state capacity alone cannot maintain policy effectiveness and economic stability indefinitely (see also Imam and Temple, 2024). As Przeworski and others (2000) emphasize, political systems and external influences, such as foreign aid or intervention, can also play significant roles in shaping this dynamic.

In examining country cases, we see numerous examples of strong positive correlations between state capacity and institutional quality. In mature democracies, such as those in typical OECD countries with long histories of stable governance, the correlation tends to be high. Here, high-quality institutions promote transparency, accountability, and the rule of law, which, in turn, bolster effective policy implementation, law enforcement, and public service delivery by the state (Acemoglu and Robinson, 2012; North and others, 2009). In highly developed countries, this correlation is often strengthened by economic resources, which enable the state to invest in capacity-building initiatives while simultaneously demanding higher institutional quality to manage complex economies effectively (Rodrik, 2004; Besley and Persson, 2011). Similarly, in post-conflict societies, international organizations may help rebuild both institutional frameworks and state capacity in a coordinated manner, fostering a strong positive correlation between the two (Collier and Hoeffler, 2004). The Republic of Korea provides a compelling example of the positive co-movement of state capacity and institutional quality. After the Korean War, the Republic of Korea pursued rapid economic development with state-led initiatives. Over time, as the economy expanded and democratization took place, institutional quality improved, bringing enhanced governance, rule of law, and transparency. This dual advancement contributed to the Republic of Korea’s transformation into a high-income country, showcasing how economic and institutional development can reinforce each other (Chang, 2003; Evans, 1995).

However, cases exist where the correlation is weak or even negative. In some resource-rich, autocratic states, such as Equatorial Guinea, the state may have high capacity in revenue collection due to resource wealth but poor institutional quality, often marked by weak rule of law, corruption, and a lack of accountability (Ross, 2001; Collier, 2007). In fragile or conflict-affected states, both institutional quality and state capacity may be low and not necessarily correlated. For instance, external interventions, parallel governance structures, or warlord economies can disrupt the usual relationship between institutions and state capacity (Bates, 2008). Countries undergoing rapid transformations, such as from conflict to peace or from authoritarianism to democracy, may experience phases where the correlation between institutional quality and state capacity is uncertain or fluctuates. In such cases, reforms in one area may outpace the other, temporarily decoupling the two. For example, Venezuela under Hugo Chávez witnessed divergence, with substantial state capacity in oil revenue management yet declining institutional quality due to corruption, erosion of the rule of law, and weakening democratic norms. This misalignment contributed to Venezuela’s economic instability and social unrest. Likewise, Zimbabwe under Robert Mugabe displayed a similar pattern, where initial high state capacity at independence in 1980 gradually deteriorated as institutional quality declined due to authoritarian governance, poorly implemented land reforms, and corruption, ultimately leading to economic collapse and hyperinflation (Imam and Temple, 2024; Herbst, 2000).

These examples illustrate the complex interplay between state capacity and institutional quality. Although they frequently reinforce each other, political decisions, economic policies, and external influences can lead to scenarios where they diverge.

III. Relative Importance of Institutions vs. State Capacity at Level of Development

The effects of major changes in state capacity and institutional quality on economic growth are highly interdependent, where the effectiveness of one often depends on the existing level of the other. When both state capacity and institutional quality are robust, they can reinforce each other, creating a stable foundation for growth through enhanced public goods provision, property rights enforcement, and efficient administration (North, 1990; Rodrik, 2004). In such environments, major changes in either state capacity or institutions tend to yield strong, positive growth impacts as they interact synergistically, fostering transparent governance and effective policy implementation (Acemoglu and others, 2001).

However, when one component is significantly stronger than the other, the effects of a major change in either dimension can vary. For instance, a substantial improvement in institutional quality—such as enhanced rule of law or anti-corruption measures—can stimulate growth only to the extent that the state has the capacity to enforce these institutional reforms. In settings where state capacity is weak, even high-quality institutions may struggle to function effectively, as poor administrative mechanisms could undermine policy enforcement and the rule of law (Besley and Persson, 2010; Evans and Rauch, 1999). Similarly, the growth impact of major changes in state capacity depends on the level of institutional quality. In countries with strong institutions that promote accountability and transparency, enhancements in state capacity are more likely to be directed toward productive ends, such as public service improvements and infrastructure development. In contrast, where institutional quality is low, increased state capacity may facilitate rent-seeking or corruption, with state resources diverted toward private gains rather than public welfare (Mauro, 1995; Tanzi and Davoodi, 1997).

This cross-conditionality also highlights the potential for threshold effects. In countries with low institutional quality, the benefits of improvements in state capacity may be minimal until institutions reach a certain threshold of effectiveness. Conversely, in settings with low state capacity, the economic benefits of institutional reform are limited until there is sufficient administrative support to implement these reforms effectively (North and others, 2009). Moreover, diminishing returns can set in when either state capacity or institutional quality is very high relative to the other. These hypotheses are empirically tested in this paper using a Smooth Transition Autoregressive (STAR) model adapted to the context of nonlinear LPs, which are specifically designed to capture threshold effects, interactions, and diminishing returns (see Section 4.1). By allowing for nonlinear dynamics, we are able to identify how the growth effects of improvements in state capacity and institutions vary depending on initial conditions and relative levels of governance. For example, in highly developed institutional environments, further increases in state capacity might yield limited additional growth if institutions are already performing optimally. Likewise, in countries with high state capacity, further institutional reform might yield diminishing returns without corresponding enhancements in state capacity to administer these reforms effectively (La Porta and others, 1999). Lastly, catalytic effects occur when a major change in one dimension (e.g., institutional reform) initiates or accelerates improvements in the other, creating a virtuous cycle of growth. For example, stronger institutions might enable reforms in state capacity by establishing frameworks for better resource allocation and management (Rodrik, 2004).

Conversely, a well-developed state capacity can provide the administrative foundation necessary to implement complex institutional reforms, thereby reinforcing institutional quality and promoting long-term growth (Acemoglu and Robinson, 2012; Evans, 1995). The case of Rwanda offers an illustrative example of this interplay. Following the 1994 genocide, Rwanda exhibited strong state capacity, particularly through its military and centralized administration, but lacked effective institutions. As Heldring and Robinson (2017) discuss, Rwanda's existing state capacity under Kagame's leadership facilitated the gradual establishment of institutional frameworks, enabling better governance, resource allocation, and public service delivery. This alignment between state capacity and institutional reform created a foundation for sustained post-conflict economic growth. The Rwandan case highlights how significant shocks, such as wars or political upheavals, can reset governance trajectories and foster virtuous cycles of state and institutional development, particularly when initial state capacity is leveraged effectively.

These interdependencies underscore that the growth impacts of changes in either state capacity or institutional quality cannot be fully understood in isolation. Instead, they must be evaluated within the broader context of each country's existing institutional and administrative frameworks, which mediate the effectiveness and sustainability of reforms. This understanding is integral to the methodological approach that follows, which aims to capture these complex cross-conditionalities and their implications for economic growth.

IV. Empirical Methodology

4.1 Identifying Shocks to State Capacity and Institutions

A key challenge in assessing the macroeconomic consequences of state capacity and institutional reforms lies in the proper identification of shocks to state capacity (SC) and institutional quality (IN). These indicators are typically highly persistent, evolving slowly and reflecting structural economic and political factors, such as development levels, demographic trends, and institutional legacies (Glaeser et al., 2004; Besley and Persson, 2011). As a result, simple year-on-year changes in these indicators risk capturing routine endogenous dynamics rather than discrete and plausibly exogenous shifts. Addressing this issue is crucial to ensure that estimated responses reflect causal effects rather than spurious correlations. To this end, our identification strategy is designed to isolate large and unexpected deviations that are more plausibly exogenous to contemporaneous macroeconomic conditions. This approach improves the validity of our econometric framework for causal inference (see section 4.2). Specifically, we adopt a multi-step procedure to generate shock series for SC and IN that more closely capture exogenous shifts.

First, we model the expected evolution of indicators using autoregressive models augmented with macroeconomic fundamentals. For each country, we estimate:

$$log(GOV_{it}) = \alpha_i + \beta_1 log(GOV_{it-1}) + \beta_2 log(GDP_{it}) + \beta_3 log(POP_{it}) + u_{it} \quad (1)$$

where GOV_{it} represents the relevant indicator (state capacity or institutional quality), while GDP_{it} and POP_{it} denote real GDP per capita and population, respectively. This formulation captures predictable variation tied to development trajectories and demographic trends.

Second, we extract the residuals u_{it}, which represent deviations from the expected path. These residuals capture unanticipated movements, including those induced by political reforms, institutional crises, or external shocks — and are therefore more likely to be exogenous with respect to near-term macroeconomic outcomes (Giuliano and Spilimbergo, 2014).
Third, to focus on economically meaningful events, we transform these continuous residuals into discrete shock indicators. We define a shock as occurring when the residual exceeds its historical country-specific mean by more than one standard deviation:

$$Shock_{it} = \begin{cases} 1 & if\ u_{it} > \overline{u_i} + \sigma_i \\ 0\ otherwise & \end{cases} \quad (2)$$

where $\overline{u_i}$ and σ_i denote the mean and standard deviation of the residuals for country i. This thresholding approach filters out minor fluctuations and isolates large, abrupt deviations, which are more likely to reflect genuine shocks rather than measurement noise or normal cyclical variation.

In addition to this residual-based approach, we construct an alternative set of shocks based on the annual change (first difference) of the relevant indicators. To better capture relative shifts within each country's historical experience, especially for slow-moving institutional variables, we define a shock as any year when the annual change ranks among the top 10 percent of all observed changes in that country. Formally, for each country, we calculate the 90th percentile of the annual change distribution and classify a year as a shock if the change exceeds this threshold. This country-specific percentile-based method ensures that shocks reflect unusually large movements relative to each country's typical institutional dynamics, which might otherwise be obscured in global thresholds due to differences in volatility across countries.

Together, these two complementary approaches allow us to capture both large residual-driven deviations from predicted institutional dynamics and relatively rare but sizable annual changes in the relevant indicators. This dual strategy improves the robustness and interpretability of our empirical analysis and aligns with recent literature emphasizing the macroeconomic relevance of large institutional shifts (e.g., Acemoglu et al., 2019; Persson, 2005).

4.2 Local Projections

The main unconditional hypothesis to be empirically tested is to understand how changes to state capacity and institutions affect real GDP per capita. While state capacity and institutions are highly persistent characteristics, significant changes can occur in response to major political, economic, or social shocks, such as conflicts, regime changes, or targeted reforms. These rare but impactful shifts provide an opportunity to analyze the dynamic effects of such changes on economic growth over time. To estimate this, we follow the local projections (LP) method proposed by Jordà (2005) to estimate impulse-response functions.[4] This approach has been advocated by Auerbach and Gorodnichenko (2013) and Romer and Romer (2019) as a flexible alternative to vector autoregressions (VAR) for estimation purposes while being on similar footing with regards to identification.[5]

Given the panel data setting, we prefer the local projections method over VAR estimation for the following reasons. First, the state capacity and institutions shocks are initially assumed to be orthogonalized to contemporaneous and expected future macroeconomic conditions, meaning that they are treated as independent of both current and anticipated macroeconomic dynamics. While this assumption simplifies the initial analysis and allows us to focus on causal relationships, we acknowledge that it may not always hold.[6] To address this, we explicitly test, in the robustness section, this assumption by conducting instrumental variable (IV) analyses to account for potential endogeneity, ensuring our results are robust to reverse causality and omitted variable bias.

Second, our estimation involves a large panel dataset with a constellation of fixed effects, which makes the direct application of standard VAR models more challenging.[7] The LP method avoids the need to estimate equations for dependent variables other than the variable of interest, thereby significantly reducing the number of estimated parameters. This feature is particularly advantageous in finite samples, where local projections tend to perform better at estimating shorter horizons of impulse responses, which is relevant for our analysis.

Third, the LP method is particularly suited to estimating nonlinearities. Unlike non-linear structural VAR models, such as Markov-switching or threshold-VAR models, the LP approach allows for a more straightforward application and interpretation of nonlinear relationships.[8] In fact, LPs are easier to implement relative to VARs when a specified nonlinearity would make the inversion of the VAR form into the VMA form difficult (Plagborg-Møller and Wolf, 2021). This flexibility is critical for exploring how state capacity and institutional reforms affect macroeconomic outcomes under different initial conditions and thresholds.

Lastly, the error term in these panel estimations is likely to be correlated across countries, which is easier to handle in the LP method by clustering standard errors or using the Driscoll-Kraay (1998) standard errors that account for arbitrary correlations of the errors across countries and time. We follow the recommendations of Herbst and Johannesen (2024) and include lags of the

[4] While this paper uses LPs and instrumental variable (IV) techniques to empirically assess the short-run impacts of state capacity (SC) and institutions (IN) on real GDP per capita growth, we recognize that Structural Equation Modeling (SEM) could offer a complementary approach in future work. SEM would enable simultaneous estimation of both direct and indirect effects of SC and IN on growth, capturing interdependencies that LP methods may not fully disentangle. However, given the short-term focus of this study, LP and IV methods are appropriate for isolating immediate effects.
[5] See Plagborg-Møller and Wolf (2021) for a discussion on the trade-offs between VARs and local projections.
[6] For instance, state capacity reforms may be implemented in response to economic crises (e.g., Mozambique), or economic collapse (e.g., Lebanon, Zimbabwe) may erode state capacity.
[7] If one wishes to introduce country fixed effects in a VAR in a panel environment that is also possible, for instance, by demeaning each model variable over time for each country before including them in VAR.
[8] See Miyamoto and others (2018) and Choi and Shin (2023) for the recent application of LP to the estimation of nonlinearities and interaction effects of exogenous shocks using a large international panel dataset – an approach like ours.

dependent and independent variables in our dynamic two-way fixed-effect panel data model.[9] The Jordà method requires estimation of a series of regressions for each horizon, *h,* and for each variable of interest (in our case real GDP per capita growth).

The basic linear LP regression model that we estimate is:

$$\Delta \log y_{i,t+h} = \alpha_{i,h} + \delta_{t,h} + \sum_{j=0}^{2} \beta_{j,h} d_{i,t-j} + \sum_{l=0}^{1} \beta_{l,h} \left(log y_{i,t-l} - log y_{i,t-1-l} \right) + \sum_{h=1}^{h} \beta_h d_{i,t+h} + \sum_{c=0}^{1} \beta'_{c,h} X_{i,t-c} + u_{i,t+h} \quad (3)$$

where h=1, …, 8 is the forecast horizon, and $\Delta \log y_{i,t+h} = \log y_{i,t+h} - \log y_{i,t}$ denotes the cumulative growth rates of the dependent variable over the forecast horizon, with log(.) denoting the logarithm. $y_{i,t}$ is real GDP per capita. α_i denotes country fixed-effects to capture unobserved heterogeneity across countries, such as time-invariant geographical variables, while δ_t are time fixed-effects to control for global shocks such as the great recession or the Covid-19 pandemic. $d_{i,t}$ is our main regressor and denotes either the state capacity (SC) or institutions (IN) shocks.

These shocks are defined as discussed in the previous subsection, capturing significant unexpected changes over time.[10] Therefore, $\beta_{0,h}$ measures the conditional mean of changes to state capacity or institutions for each forecast horizon h on $\Delta \log y_{i,t+h}$, and is used to construct the Impulse Response Function (IRFs) and their associated confidence intervals. When we forecast one year ahead, we have a maximum of 3826 observations for state capacity changes in the estimation sample. For each additional year-ahead forecast, we lose observations equal to the number of cross-sectional units, *i*, in the sample, a maximum of 129.[11]

Treatment lags are included to capture the effect that previous shocks may have on the outcome variable. We use the Akaike information criterion (AIC) to determine the appropriate lag length, which indicates that 2 lags of the treatment variable should be used. Additionally, we include yearly lags of $\Delta \log y_{i,t}$ to control for serial correlation in the error term, $u_{i,t+h}$. The number of lags for this variable (1) is also determined by the AIC. The data is stationary as $\left| \sum_{l=0}^{4} \beta_{l,h} \right| < 1$ in all our specifications.[12] In fact, $\sum_{l=0}^{4} \beta_{l,h}$ is between small for all h, indicating low persistence in the estimated models. Therefore, the estimated IRFs from the LPs are unlikely to be severely affected by bias from a relatively short time dimension (t=46 for most of our cross-

[9] Controlling for country-specific and time-invariant characteristics through fixed effects can help address some of the endogenous relationship by removing unobserved heterogeneity.

[10] To facilitate interpretation, IRFs are scaled to reflect the effect of a one-unit increase in the relevant indicator. Since the identified shocks are defined as large, unexpected changes (i.e., residuals exceeding one standard deviation), the LP coefficients capture the average response to the occurrence of such major shifts. Accordingly, we scale the IRFs by the average change in the relevant indicator observed when shocks occur, calculated for the whole sample but also separately by income group when the latter analysis is conducted. This approach ensures that the responses are expressed per unit of the relevant indicator change rather than per shock occurrence and is consistent with established practices in macroeconomic shock identification studies, where scaling reflects the typical size of policy or institutional shifts (e.g., Alesina and Ardagna, 2010; Jordà and Taylor, 2016).

[11] In the case of institutions, the main proxies are the World Bank Government Effectiveness and v-Dem Political Civil Liberties Index. In these cases, when we forecast one year ahead, we have 1126 observations corresponding to 55 countries and 4719 observations corresponding to 130 countries, respectively.

[12] This finding is confirmed using Fisher-type panel stationarity tests, which are available on request.

sectional units), even in cases of high persistence, as shown by Herbst and Johanssen (2024).[13] The term $\sum_{h=1}^{h} \beta_h d_{i,t+h}$ captures the Teulings and Zubanov (2014) correction. Leads of the state capacity shocks are included to avoid the bias from overlapping forecast horizons.[14] These leads are statistically significant for most combinations of $y_{i,t}$ and h, underscoring the need to control for overlapping forecast horizons. $X_{i,t}$ is a vector of additional control variables, including contemporaneous and first lags of the variables identified below. To substantiate the selection of key control variables, we link each control to the existing literature or economic theory that highlights its relevance:

- **Investment (Gross Capital Formation):** Investment is critical to capital accumulation, productivity, and economic growth, as established in the Solow growth model (Solow, 1956). Capital formation expands a country's productive capacity by enabling firms to adopt new technologies and increase output efficiency, enhancing GDP per capita. Other research, such as that by Barro (1991), also demonstrates a positive relationship between capital investment and economic growth across different contexts.

- **Inflation Rate**: Inflation influences economic agents' decisions regarding consumption, saving, and investment. According to the Fischer effect (Fischer, 1993), moderate inflation can encourage spending, but high or unpredictable inflation may lead to increased uncertainty, discouraging long-term investments and savings. Studies like those by Barro (1995) and Bruno and Easterly (1998) also find that high inflation correlates negatively with economic growth, especially in developing countries.

- **Trade Openness:** Trade openness fosters economic growth by exposing domestic firms to global competition, promoting innovation, and enhancing access to larger markets. Frankel and Romer (1999) empirically showed that open economies tend to grow faster due to these gains. The positive impact of trade on productivity and growth has also been emphasized by Sachs and Warner (1995), who argue that trade openness facilitates technology transfer and specialization, both of which drive growth.

- **Population Growth:** The effect of population growth on economic growth is nuanced. While a growing population can expand the labor force and market size, it may also create pressure on resources and social infrastructure if growth exceeds capacity. Bloom and Williamson (1998) found that demographic transitions could spur economic growth, especially in regions undergoing rapid development. Barro and Becker (1989) add that, over time, population growth can influence both labor supply and savings, impacting overall economic performance.

- **Policy Uncertainty**: Policy uncertainty can deter investment by increasing the risk associated with long-term business and financial planning. Research by Baker, Bloom, and

[13] As a robustness test, we use the bias corrected panel data estimator derived in Herbst and Johanssen (2024). As expected—see results in section 4—the results from that estimator are very similar to the results estimated using eq.(1); thus, we conclude that the bias is negligible.

[14] The bias increases with the forecast horizon, as noted by Teulings and Zubanov (2014). Including the leads of the state capacity shocks ensures that any impact from the reforms ahead of time is captured in the data. This is particularly relevant for country-year pairs where no state capacity shock took place. However, state capacity shocks may recur within our 6 years forecast horizon. In such case, the Teulings and Zubanov (2014) approach accounts for the possibility that the outcome of a treated observation may be influenced by subsequent shocks. This adjustment prevents the upward bias that would otherwise affect the estimated impact of state capacity shocks.

Davis (2016) shows that uncertainty in fiscal and regulatory policies leads to reduced economic activity and lower growth rates, as firms delay investment and hiring in response to unpredictable policy environments. Similarly, Alesina and others (1996) emphasize that policy stability is essential for growth because it provides a predictable environment for both domestic and foreign investors.

In all our LPs, we use Spatial Correlation Consistent (SCC) standard errors as proposed by Driscoll and Kraay (1998). We test for spatial dependence in the disturbances between cross-sectional units when using standard errors clustered at the country level, as is common in the LP literature. The Pesaran (2015) test, which is standard normally distributed, is employed for this purpose. A value of the test statistic outside the [-1.96, 1.96] interval rejects the null hypothesis of weak cross-sectional dependence in favor of cross-sectional dependence. The test is often significant.[15]

Understanding these nonlinear interactions is essential for a balanced approach to economic growth, as strengthening state capacity or enhancing institutional quality in isolation might not produce optimal results. Effective policy should address both state capacity and institutional quality in tandem, recognizing that they function interdependently, and their alignment can amplify economic growth. This perspective supports a holistic approach where policy interventions are designed with the specific institutional and capacity contexts of each country or region in mind, maximizing sustainable development potential.

To further investigate these dynamics, we examine whether the effect of changes in state capacity on growth is contingent upon the prevailing level of institutional quality at the time of the change, differentiating between high and low institutional levels relative to the sample median. Similarly, we assess whether the impact of institutional changes on growth varies based on the level of state capacity. By augmenting our model to capture these conditional effects, we aim to understand how the interactions between state capacity and institutional quality influence economic growth, offering a more nuanced framework for policy design. The resulting model is thus structured to evaluate the combined and conditional effects of state capacity and institutions on economic performance.

To this end, we integrate the Smooth Transition Autoregressive (STAR) model by Granger and Teravistra (1994) with the baseline Local Projections (LP) method to examine nonlinearities in the relationship between state capacity, institutional quality, and economic growth. The STAR model is ideal for capturing regime-dependent dynamics, allowing the effects of state capacity or institutional quality changes on growth to vary based on threshold levels of the conditioning variable. This approach is effective for exploring how different institutional or capacity contexts shape growth responses, revealing potential threshold and transition effects. By combining STAR with LP, we can estimate both direct, short-term impulse responses and the longer-term, regime-dependent transitions. STAR's flexibility in modelling smooth shifts between regimes helps us analyze how economic responses to shocks differ across varying levels of institutional quality or state capacity, enhancing our understanding of growth trajectories and resilience across diverse economic conditions.

[15] Results are available on request. The SSC standard errors are also cluster robust in addition to being robust to spatial correlation, see Driscoll and Kraay (1998).

The new augmented alternative specification takes the following form:

$$\Delta \log y_{i,t+h} = \alpha_{i,h} + \delta_{t,h} + \sum_{j=0}^{2} \beta_{j,h}^{L} F(z_{i,t}) d_{i,t-j} + \sum_{j=0}^{1} \beta_{j,h}^{H} F(1-(z_{i,t})) d_{i,t-j} + \sum_{l=0}^{4} \beta_{l,h} \left(log y_{i,t-l} - log y_{i,t-1-l} \right) + \sum_{h=1}^{h} \beta_{h} d_{i,t+h} + \sum_{c=0}^{1} \beta_{c,h}' X_{i,t-c} + u_{i,t+h} \quad (4)$$

where,

$$F(z_{it}) = \frac{\exp{(-\gamma z_{it})}}{1 + \exp{(-\gamma z_{it})}}, \quad \gamma > 0$$

with z_{it} being an indicator of IN or SC normalized to have zero mean and unit variance. The weights assigned to each regime vary between 0 and 1 according to the weighting function $F(.)$, so that $F(z_{it})$ can be interpreted as the probability of being in a given state of IN or SC, low or high. The coefficients $\beta_{j=0,h}^{L}$ and $\beta_{j=0,h}^{H}$ are used to construct the IRFs and the associated confidence interval for state capacity (or institutions) changes introduced when the level of institutions (or state capacity) is low or high. They respectively capture the impact of state capacity changes at each horizon *h* in cases of low level of institutions ($F(z_{it})$≈1 when z goes to minus infinity) and high level of institutions (1-$F(z_{it})$)≈1 when z goes to plus infinity).

State dependent LPs (whether smooth transition or not) have been used extensively (e.g., Ramey and Zubairy, 2018; Alpanda and others, 2021; Ortsman and Tripier, 2021; de Haan and Wiese, 2022). In our state-dependent context, the LP methodology offers two key advantages over VARs. First, LPs provide a simple way to account for state-dependence, especially in a panel framework. Second, unlike regime-switching VARs, they do not require one to take a stand on the duration of a given state or on the mechanism triggering the transition between states. One important caveat is that the state should be uncorrelated with the shock. As Gonçalves and others (2024) show, when the state is exogenous, the LP estimates recover the population response regardless of the size of the shock. However, when the state depends on the shock, the LPs only recover the conditional response to a small shock, but not the response to larger shocks.

In our estimation sample, the unconditional correlation coefficient between the state capacity shocks and institutional shocks (either from the World Bank GEE or the v-Dem Political Civil Liberties Index) is very low and statistically insignificant at the 5 percent level. This suggests that our results when estimating eq. (3) are unlikely to be affected by potential bias due to a high correlation between the “shocks” and the state. However, the visual correlation in Figure 1 might seem higher due to two reasons. First, Figure 1 depicts long-term trends or broader patterns, which could visually suggest a correlation even when the specific short-term "shock" and "state" variables used in the regression are only weakly correlated. Second, differences in scale, aggregation, or the treatment of extreme values in the graphical representation can emphasize apparent relationships that do not hold statistically. This highlights the importance of relying on formal statistical measures rather than visual intuition alone. The low unconditional correlation in our data provides confidence that our estimates are not driven by spurious relationships between shocks and the state. To further ensure robustness, we complement this analysis with sensitivity checks and alternative specifications.

V. Data and Stylized Facts

We have two main dimensions to consider as variables of interest: shocks in state capacity and in institutions. Given the contested nature of any single definition, we adopt a working definition for the purposes of this analysis.

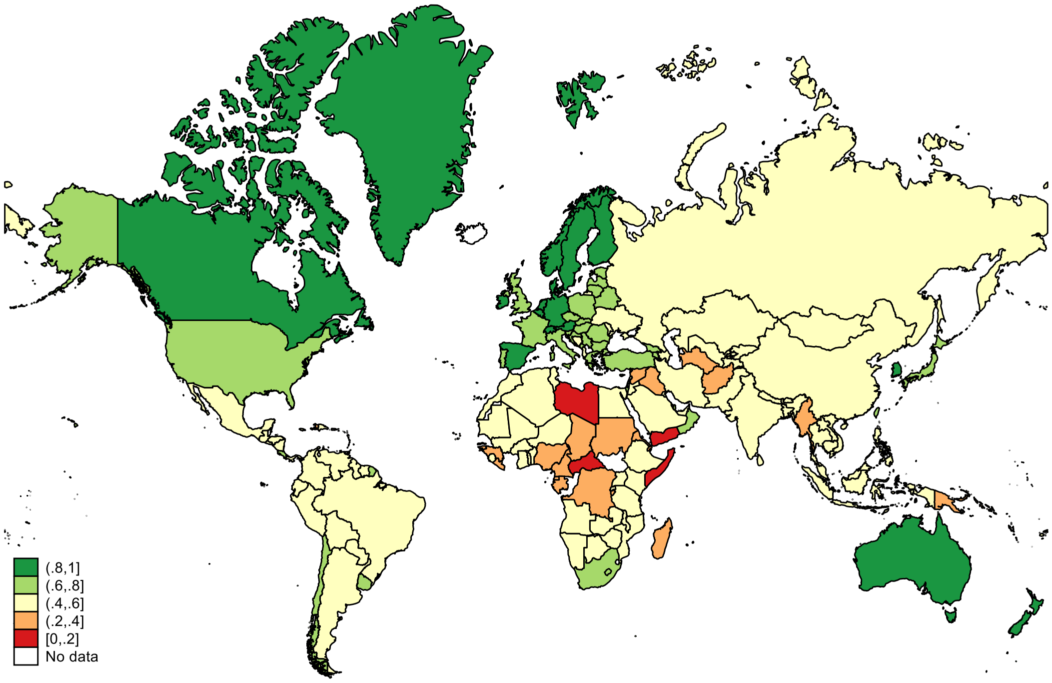
Starting with state capacity, this dimension is measured using a comprehensive proxy that integrates 21 indicators across three core dimensions: extractive, coercive, and administrative capacity. These dimensions reflect the state's ability to mobilize resources, enforce laws, and manage public administration effectively. The dataset, developed by Hanson and Sigman (2021), fills a crucial gap in comparative, cross-national research by providing a nuanced, multidimensional measure of state capacity. Importantly, it distinguishes state capacity from other variables, such as economic development or regime type, providing a more precise understanding of state functionality across countries. Higher values in this measure indicate greater state capacity, capturing not only economic strength but also the organizational and coercive capabilities of the state. The dataset spans 177 countries and covers the years 1960–2015, enabling extensive cross-national and historical analysis. Methodologically, it employs latent variable modelling techniques to ensure the validity and reliability of the state capacity estimates, with further details available in the article’s online appendix. This robust measure allows us to capture significant shifts in state capacity and examine how abrupt increases or decreases in these dimensions impact economic growth, particularly when conditioned by the level of institutional quality.

To capture institutional quality in its multiple dimensions, this paper draws on two complementary sources: the Government Effectiveness Index (GEE) from the World Bank’s Worldwide Governance Indicators (WGI) and the Political Civil Liberties Index from V-Dem. Together, these indicators offer a nuanced representation of the institutional environment relevant for state capacity and long-term economic development.

The Government Effectiveness Index captures perceptions of the quality of public services, the competence of the civil service, the quality of policy formulation and implementation, and the credibility of the government’s commitment to its policies. Unlike indicators focused on citizen rights, the GEE emphasizes the administrative and managerial dimensions of institutional performance—that is, the government’s ability to design and implement policies effectively and deliver public goods. Drawing on data covering over 200 countries since the 1990s, the GEE is a well-established source for assessing bureaucratic and policy-based aspects of governance and provides an essential complement to rights-based measures.

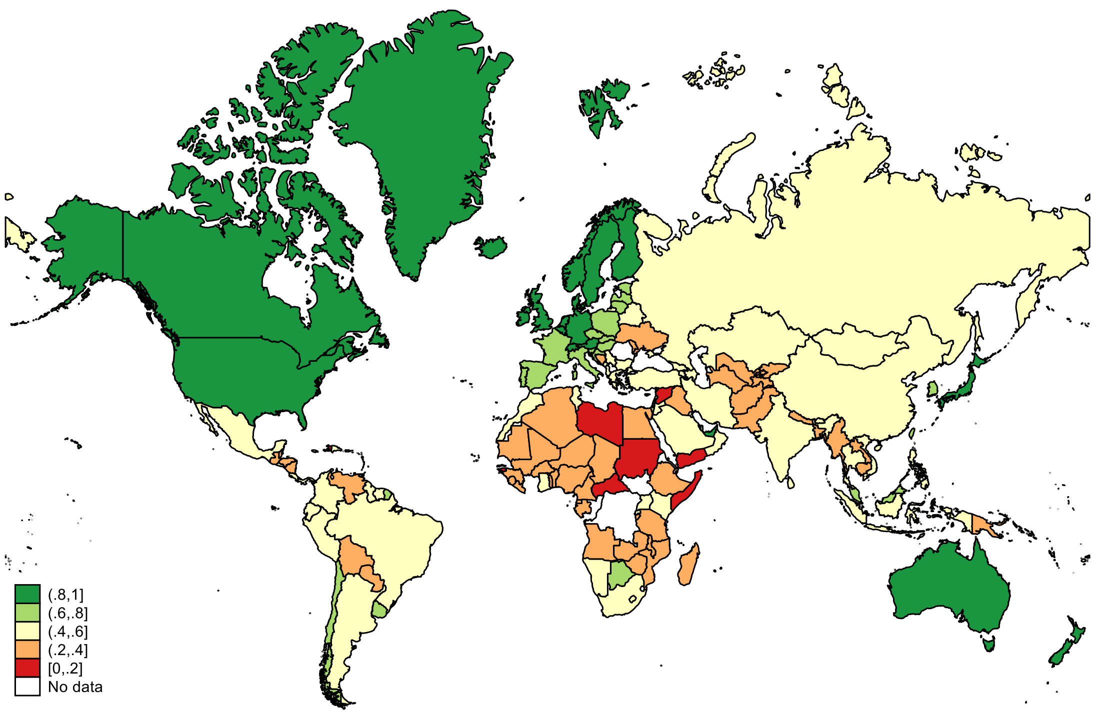
To broaden the perspective to include the institutional foundations of openness and accountability, the paper also employs the Political Civil Liberties Index (central estimate) from V-Dem. This index reflects the extent to which individuals enjoy freedoms of expression and association, capturing how civil liberties are exercised in practice rather than merely codified in law. Robust civil liberties contribute to inclusive governance and serve as a constraint on arbitrary power—key features of high-quality institutions. Produced by V-Dem (2025 edition) and processed by Our World in Data, the index spans the period 1789–2024 and offers exceptional historical depth, granularity, and methodological rigor.

Figure 2.a State Capacity Index, 2015



Note: normalized state capacity

Figure 2.b Government Effectiveness Rating, 2015

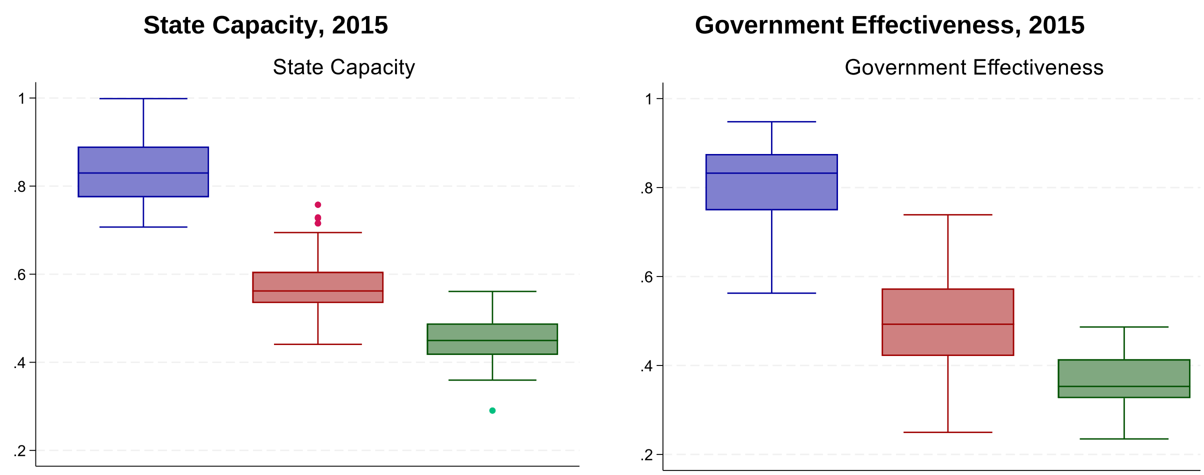


Note: normalized government effectiveness

Compared to alternative indicators, such as Freedom House, it allows for more refined analyses of institutional persistence and evolution.[16]

These two indicators are highly complementary. The Government Effectiveness Index captures the technical and managerial dimensions of institutional performance, reflecting the state's capacity to design and implement policies and deliver public goods. In contrast, the Political Civil Liberties Index highlights democratic principles, inclusiveness, and constraints on executive power, focusing on how civil rights are exercised in practice. Taken together, they offer a more complete assessment of institutional quality, spanning both bureaucratic competence and political freedoms. This dual perspective is particularly valuable for cross-country analysis, as it enables a nuanced understanding of how variations in administrative effectiveness and civil liberties jointly interact with state capacity to shape patterns of economic growth.

Figure 3. Box-Whisker of normalized (0-1) variables by income group



Note: normalized variables. Blue=AE, Red=EMEs, Green=LICs

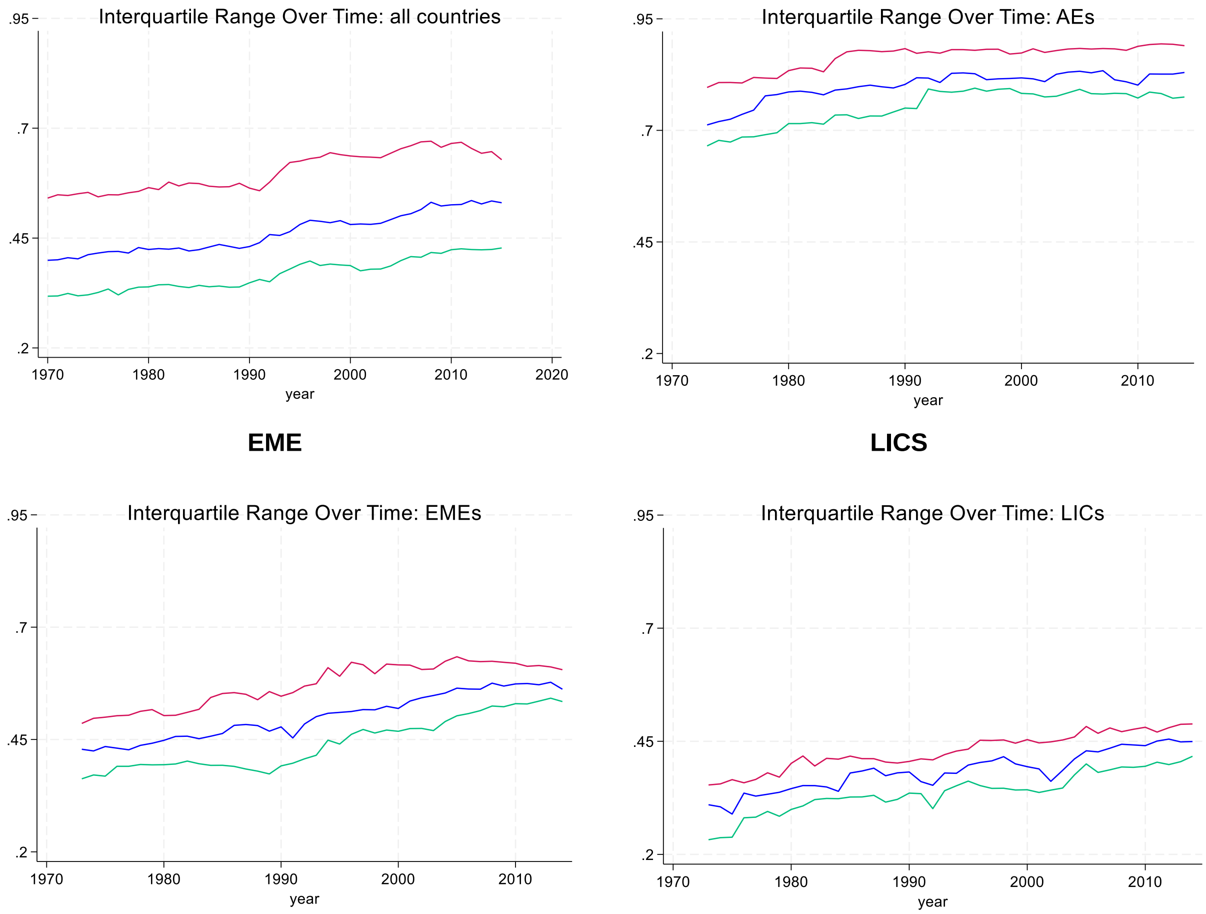
Figures 2.a and 2.b present world maps depicting state capacity and government effectiveness in 2015, respectively. A clear correlation emerges between the stage of development and these variables, with higher values (shown in green) concentrated in Europe, Australia, and North America. Detailed variable descriptions, data sources, and descriptive statistics are provided in Annex Table A1.

[16] While Freedom House's Political Rights and Civil Liberties indices remain widely used, they have several limitations for empirical research on institutions. First, they offer relatively coarse measurement, using ordinal scales with limited variation across countries and over time, which restricts their ability to capture gradual institutional changes or subtle cross-country differences. Second, Freedom House's coverage begins only in the early 1970s, precluding analyses of institutional persistence or historical legacies. In contrast, the V-Dem Political Civil Liberties Index provides annual, continuous measures from 1789 onwards, enabling long-run studies. Third, V-Dem employs a transparent, expert-coded approach with sophisticated Bayesian aggregation methods designed to mitigate coder bias and measurement error. This results in higher granularity, methodological rigor, and replicability, making the V-Dem index better suited for fine-grained, quantitative analyses of institutional quality across space and time.

Further evidence is presented in Figure 3, which compares the three income groups—Advanced Economies (AEs), Emerging Market Economies (EMEs), and Low-Income Countries (LICs)—for both variables. Figures 4.a and 4.b illustrate the interquartile range of each variable over time. While state capacity shows an upward trend across all income groups, the trajectory of government effectiveness appears more stable, with no clear upward or downward pattern over time.

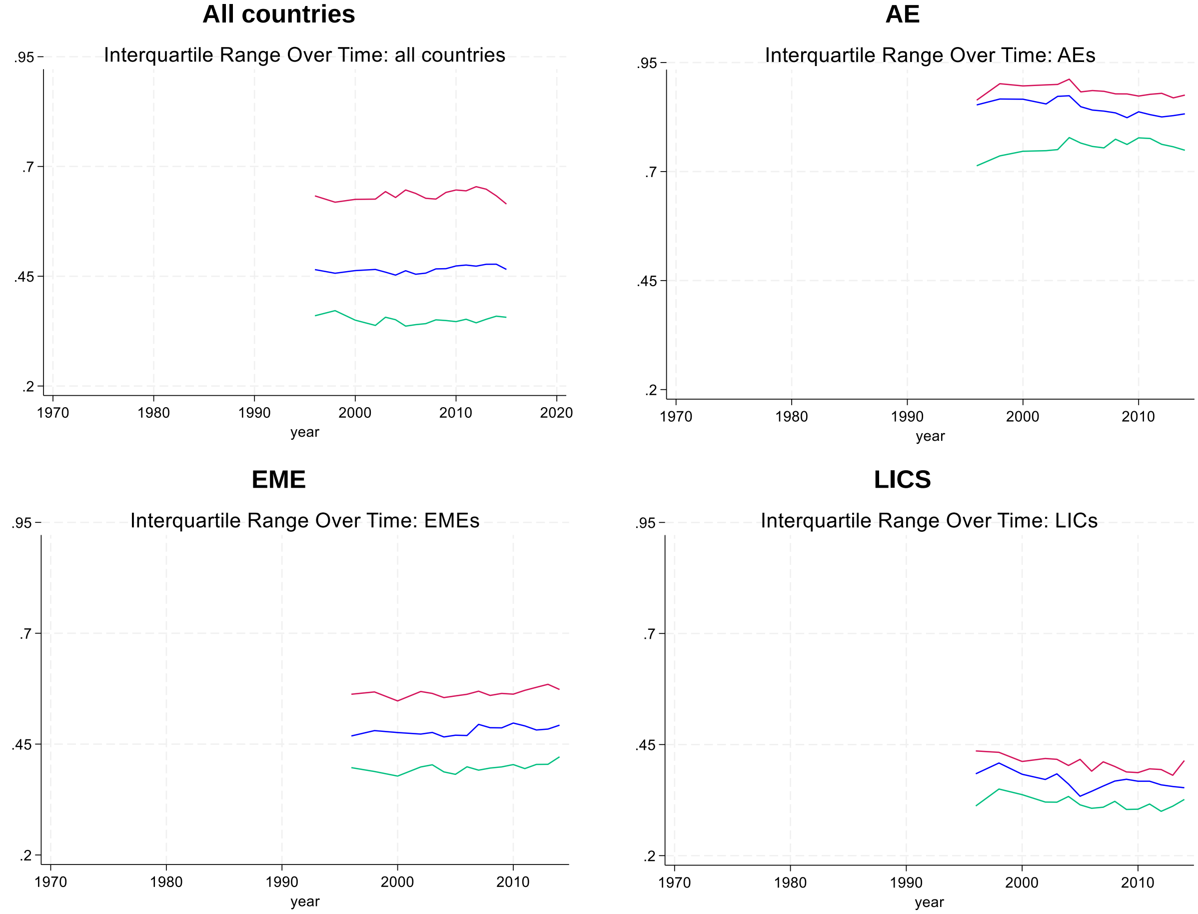
Figure 4.a Interquartile range of normalized (0-1) state capacity index by income group, 1970-2015

All countries **AE**



Note: normalized variable. Red = top quartile, Blue= median; Green=bottom quartile

Figure 4.b Interquartile range of normalized (0-1) government effectiveness index by income group, 1970-2015



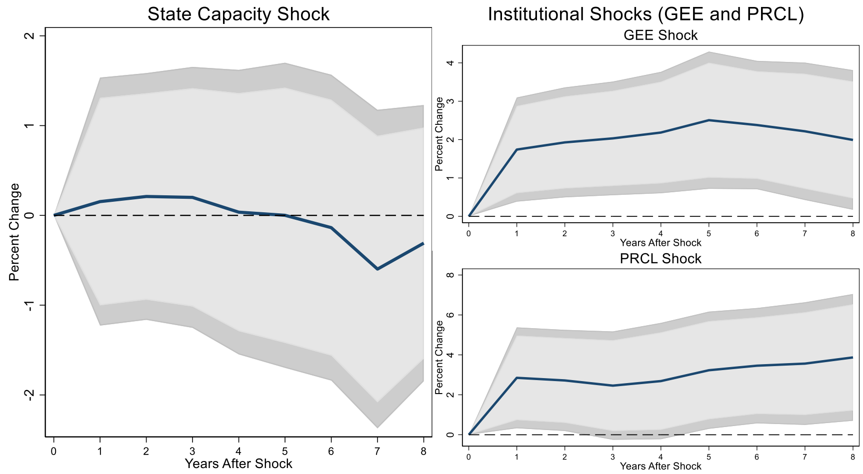
Note: normalized variable. Red = top quartile, Blue= median; Green=bottom quartile

VI. Results and Discussion

6.1 Baseline LP results

To begin the analysis, we examine the baseline, unconditional responses of real GDP per capita growth to positive, unanticipated shocks in state capacity and institutional quality. Figure 5 plots the dynamic responses to these shocks, with the solid blue lines depicting the estimated impulse responses and the dark and light grey shaded areas representing the 90 percent and 95 percent confidence intervals, respectively. The results reveal a clear asymmetry between the effects of state capacity and institutional shocks. Positive state capacity shocks do not exhibit a statistically significant impact on real GDP per capita growth at any horizon, as the confidence intervals consistently encompass zero. In contrast, institutional shocks, whether measured by the Government Effectiveness Index (GEE) or the Political Civil Liberties Index (PRCL), generate strong and persistent positive effects on economic growth. Specifically, the cumulative increase in real GDP per capita reaches approximately 2 percent following a GEE shock and about 4 percent after a PRCL shock over an eight-year horizon. These effects are not only statistically significant but also display sustained trajectories, underscoring the durability of institutional improvements in fostering long-term growth.

Figure 5. Unconditional Local Projections: effect of shocks in state capacity and institutions on real GDP per capita growth (in percent) (full sample)



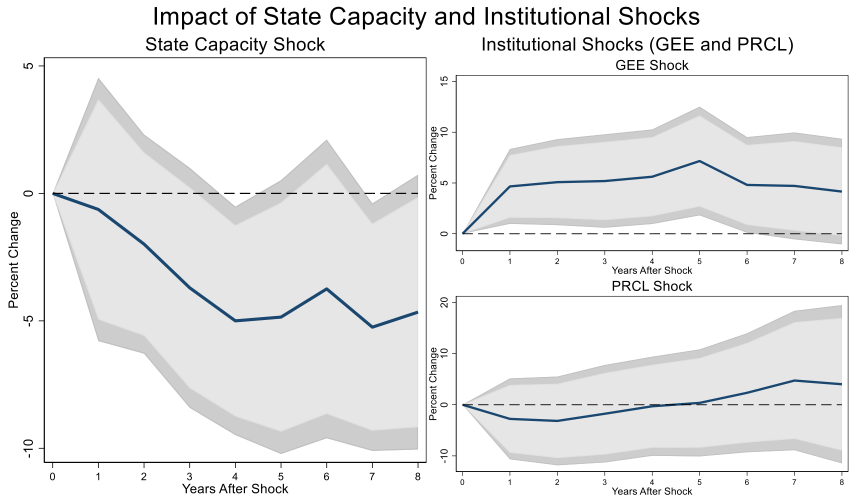
Notes: The figure displays impulse responses of state capacity and institutional shocks on real GDP per capita growth. Year 1 refers to the first year following the occurrence of the shock at Year 0. The solid blue lines represent the estimated responses, with the position at, for example, Year 8 indicating the cumulative change in the log of real GDP per capita eight years after the shock. Dark grey shaded areas denote 90% confidence intervals based on small-sample corrected (SCC) standard errors, while light grey shaded areas indicate 95% confidence intervals. The left panel presents responses to a state capacity shock, whereas the right panels report responses to institutional shocks, distinguishing between government effectiveness (GEE) and political civil liberties (PRCL). The corresponding regression results underlying these impulse responses are reported in Tables A2, A3 and A4 in the Annex.

We also addressed potential concerns related to dynamic heterogeneity across countries, which could bias the estimated effects. As noted in recent contributions (e.g., Canova, 2024), heterogeneous dynamic responses may distort panel impulse responses. However, our findings prove robust to these concerns. Following established approaches (Pesaran, 2006; Canova, 2024), we re-estimated the responses using both simple and weighted averages of country-specific estimates. The results (not shown but available upon request) remain closely aligned with the panel estimates, suggesting that any bias arising from dynamic heterogeneity is minimal and does not materially affect our conclusions.

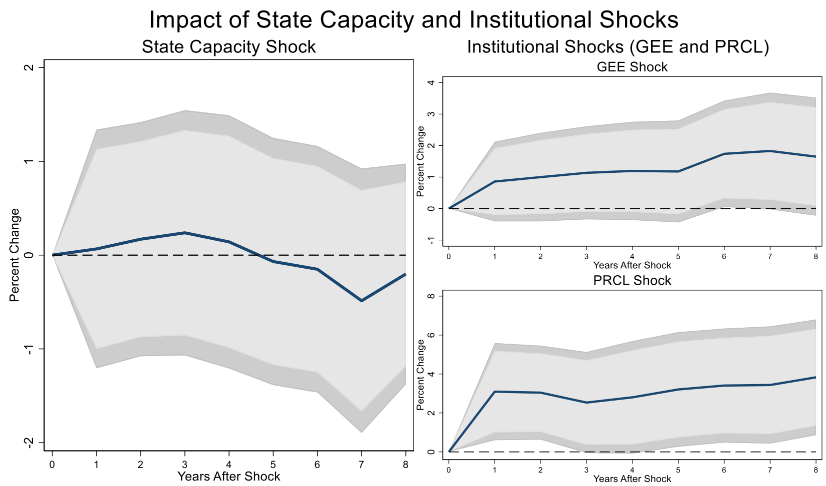
When examining the effects of state capacity and institutional shocks on real GDP per capita growth across different income groups, updated results reveal clear heterogeneity between advanced economies (AEs) and emerging market and developing economies (EMDEs) (see Figure 6). In advanced economies, a state capacity shock is associated with a borderline statistically significant negative impact on growth, especially over the medium term. This suggests that in institutional contexts where bureaucratic and administrative systems are already mature, efforts to enhance state capacity may introduce temporary inefficiencies, rigidities, or administrative frictions that suppress growth. Such effects could stem from the restructuring of public systems, reallocation of resources, or unintended increases in administrative burden. Over time, these disruptions may outweigh the marginal benefits of improved state functions, particularly where governance is already relatively efficient. This aligns with the idea of diminishing marginal returns to state-building reforms in high-capacity states (Campos, De Grauwe, and Yuemei, 2023).

Figure 6. Unconditional Local Projections: effect of changes on state capacity and institution on real GDP per capita growth (in percent) (by income group)

Panel 1. Advanced Economies



Panel 2. Emerging Markets and Developing Economies



Notes: The figure displays impulse responses of state capacity and institutional shocks on real GDP per capita growth. Year 1 refers to the first year following the occurrence of the shock at Year 0. The solid blue lines represent the estimated responses, with the position at, for example, Year 8 indicating the cumulative change in the log of real GDP per capita eight years after the shock. Dark grey shaded areas denote 90% confidence intervals based on small-sample corrected (SCC) standard errors, while light grey shaded areas indicate 95% confidence intervals. The left panel presents responses to a state capacity shock, whereas the right panels report responses to institutional shocks, distinguishing between government effectiveness (GEE) and political civil liberties (PRCL).

In contrast, shocks to government effectiveness (GEE) produce a positive and statistically significant effect on growth in AEs. This indicates that targeted improvements in policy implementation, coordination, and service delivery continue to yield meaningful economic benefits even in mature economies. By contrast, reforms associated with political rights and civil liberties (PRCL) exhibit no statistically significant effect on growth. This may reflect the fact that political liberalization in AEs, where democratic institutions are already established, does not fundamentally alter the economic policy environment or affect investor expectations. In such contexts, additional democratic reforms may yield more symbolic than economic effects.

Turning to EMDEs, the growth response to governance shocks reveals a different pattern. State capacity shocks show no statistically significant effect on growth. This may reflect implementation constraints or delayed effects in environments with more limited bureaucratic resources. In contrast, GEE shocks yield a positive and borderline statistically significant impact, suggesting that EMDEs stand to benefit from reforms that strengthen public administration and policy execution. Improvements in these areas can help reduce inefficiencies, improve trust in government, and enhance the delivery of public goods, all of which support economic activity. Most notably, PRCL shocks in EMDEs produce a positive and statistically significant impact on real GDP per capita. This finding underscores the critical role that political liberalization and improvements in civic institutions can play in developing contexts. Expanding rights, enhancing transparency, and strengthening checks and balances appear to foster a more stable and predictable policy environment, which can attract investment, support inclusive policymaking, and reduce political risk (Rodrik, 2004; Acemoglu and Robinson, 2006). The outsized impact in EMDEs likely reflects the lower baseline institutional quality—where even modest improvements can trigger substantial economic gains (Mauro, 1995; Evans and Rauch, 1999).

Analyzing positive and negative changes to state capacity and institutions separately is important due to the distinct mechanisms through which these changes impact economic performance. While Figure 6 presented the growth effects of positive shocks to governance dimensions, Appendix Figure A1 extends the analysis by explicitly contrasting positive and negative shocks to state capacity and institutional quality. This contrast allows for a more complete understanding of whether improvements and deteriorations are symmetric in their economic consequences. The findings reveal that the effects of governance change are highly asymmetric and income-group specific, echoing broader insights from the institutional economics and development literature.

In advanced economies, there is no statistically significant difference between positive and negative shocks to state capacity. Both effects are small and statistically muted, consistent with the notion of diminishing marginal returns in high-capacity settings, where institutional redundancy, legal safeguards, and bureaucratic depth act as stabilizers (Acemoglu, 2005; Fukuyama, 2013; North et al., 2009). By contrast, institutional quality shocks, encompassing both government effectiveness (GEE) and political rights and civil liberties (PRCL), display mixed dynamics. For GEE, positive shocks significantly boost GDP, while negative shocks are economically negative but statistically insignificant, suggesting that incremental improvements in implementation capacity still matter in mature economies (Kaufmann et al., 1999; Andrews et al., 2017). For PRCL, no significant asymmetry is observed, likely reflecting the institutional maturity and resilience of democratic frameworks in AEs, where marginal political shifts tend not to affect economic outcomes (La Porta et al., 2004; Rodrik and Wacziarg, 2005).

In EMDEs, the patterns are more pronounced. As with AEs, state capacity shocks, whether positive or negative, do not produce statistically significant growth effects, possibly due to implementation lags or the absence of complementary institutional reforms (Besley and Persson, 2011; Grindle, 1997). However, institutional shocks are clearly asymmetric. For both GEE and PRCL, positive shocks lead to statistically significant increases in GDP, while negative shocks either yield significant losses (PRCL) or are statistically insignificant but directionally negative (GEE). These results highlight the outsized returns to institutional improvement in lower-capacity settings, where even modest reforms, such as strengthening legal protections, improving service delivery, or enhancing civil liberties, can unlock growth by fostering credibility, reducing uncertainty, and attracting investment (Rodrik, 2004; Acemoglu and Robinson, 2006; Barro, 1996; Pritchett et al., 2013).

6.2 Nonlinear LP results

Figure 7 investigates the interaction between state capacity and institutional quality in shaping the impact of governance reforms on real GDP per capita growth, across advanced economies (AEs) and emerging market and developing economies (EMDEs). The results reveal that the effects of governance shocks are conditional, asymmetric, and reflect deep complementarities between these two dimensions of state functionality. These findings support longstanding theoretical perspectives suggesting that economic development depends not only on the existence of capable institutions or administrative capacity, but on their mutual reinforcement (North, 1990; Rodrik, 2004).

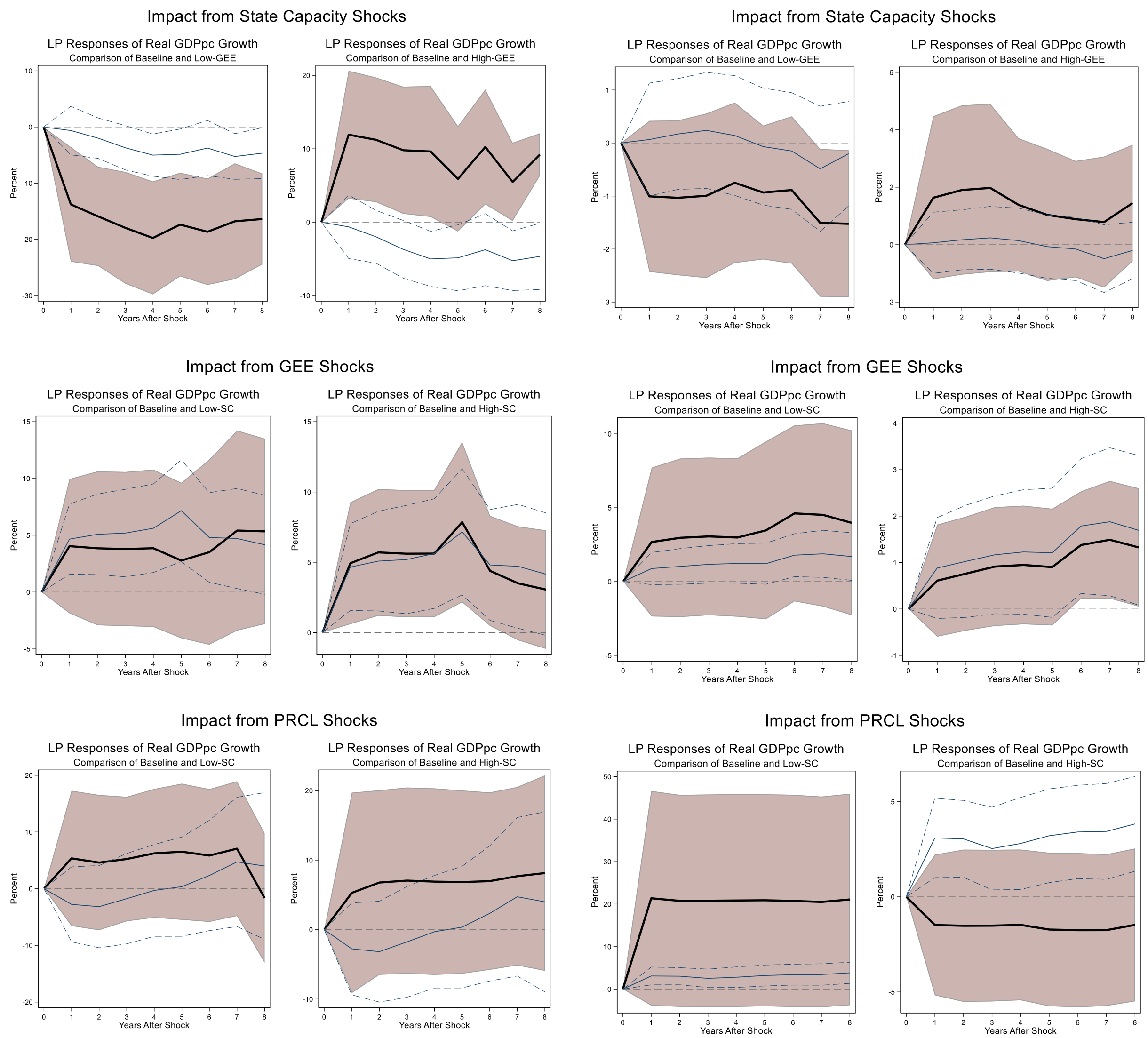
In AEs, a positive state capacity shock generates statistically significant negative effects on GDP in contexts of low institutional quality (GEE), but positive and significant effects when GEE is high. This divergence illustrates the nonlinear nature of governance reform outcomes. As theory suggests, in countries where institutional quality is weak, increases in state capacity may fail to enhance development and can even become counterproductive. In such settings, administrative expansion may fuel inefficiencies, increase red tape, or empower rent-seeking bureaucracies, particularly if not anchored in transparent, accountable institutions (Mauro, 1995; Acemoglu and Robinson, 2012). The benefits of greater administrative reach are only realized when institutions can guide, constrain, and channel that capacity toward productive ends. These results align with the broader notion that institutional quality provides the enabling framework within which state capacity translates into economic gains. In high-GEE environments, enhanced capacity leads to stronger public service delivery, macroeconomic stability, and improved regulatory enforcement, critical drivers of long-term growth (Besley and Persson, 2010). Thus, the results highlight how state capacity and institutional quality are complements, not substitutes, in promoting development. This complementarity is further supported by the effects of institutional quality shocks (GEE): these are positive and statistically significant only when state capacity is high. In low-capacity contexts, institutional reforms may lack the implementation infrastructure, such as personnel, systems, or fiscal space, to be effective. As La Porta et al. (1999) and Grindle (1997) have emphasized, policy design alone is not enough; a capable bureaucracy is essential to enforce regulations, monitor compliance, and translate formal rules into real-world outcomes. In this sense, state capacity serves as the operational backbone of institutional reform.

Interestingly, PRCL shocks in AEs do not display significant differences between high- and low-capacity settings. This suggests that, in mature democracies, marginal changes in civil liberties may have limited macroeconomic consequences, possibly because baseline protections are already strong and political institutions are resilient (Rodrik and Wacziarg, 2005; La Porta et al., 2004).

In EMDEs, the dynamics are somewhat different, though the core logic of complementarity remains. State capacity shocks, whether positive or negative, do not produce significantly different effects across levels of institutional quality. This may reflect structural rigidities, implementation delays, or political resistance to reform that prevent capacity improvements from translating into near-term growth effects, regardless of institutional strength (Grindle, 1997; Pritchett et al., 2013). For GEE shocks, however, the growth benefits materialize only when state capacity is high, replicating the AE pattern.

Figure 7. Conditional Local Projections: effect of state capacity shocks on real GDP per capita growth conditional on the institutional quality level (by income group)

Advanced Economies *Emerging Markets and Developing Economies*



Notes: The solid black lines in the figure plots the impulse responses of a given positive or negative change in a specific variable of interest on real GDP per capita growth. Year=1 is the first year after a shock took place at year=0. So, the position of the line at e.g., year=8 shows the change in the log of real GDP per capita 8 years after the shock. The light pink shaded areas display the 90% SCC error bands. The solid blue line denotes the overall unconditional baseline result displayed earlier in Figure 5 with associated 90% SCC error bands in dotted blue lines.

While there is slightly more uncertainty in EMDE estimates, medium-term effects (from year 6 onward) are positive and statistically significant. This finding reinforces that, in lower-capacity states, the ability to implement, monitor, and enforce new institutional arrangements is often lacking, limiting the short-term efficacy of reforms (Andrews et al., 2017). Thus, stronger institutions in EMDEs require capable states to meaningfully affect growth trajectories. Once again, PRCL shocks do not show significant differences based on the level of state capacity, suggesting that their economic relevance in EMDEs may depend more on political context or regime stability than administrative implementation per se.

Figure 7 underscores a central lesson in development economics: neither state capacity nor institutional quality alone ensures sustained growth, they must progress together. Strong institutions without administrative capability limit implementation, while capacity without sound institutions risks inefficiency or capture (North et al., 2009; Acemoglu and Robinson, 2012). The findings caution against one-dimensional reform, effective development requires sequencing and coordination, with capacity and institutional quality advancing in tandem. Put simply, state capacity is the engine, institutional quality the steering andboth are essential to drive growth.

6.3 Channels

To understand the effects of state capacity and institutional quality on real GDP per capita growth, we examine three main channels: GDP components, labor market dynamics, and economic stability. Each channel highlights specific mechanisms through which effective governance and robust institutions influence economic outcomes.

GDP Components

Disaggregating GDP into its core components—private consumption, public consumption, investment (gross fixed capital formation), and net exports—offers deeper insight into how state capacity and institutional quality shape the transmission mechanisms of economic growth. Figure 8 presents these dynamics, highlighting heterogeneous effects by income group and governance dimension.

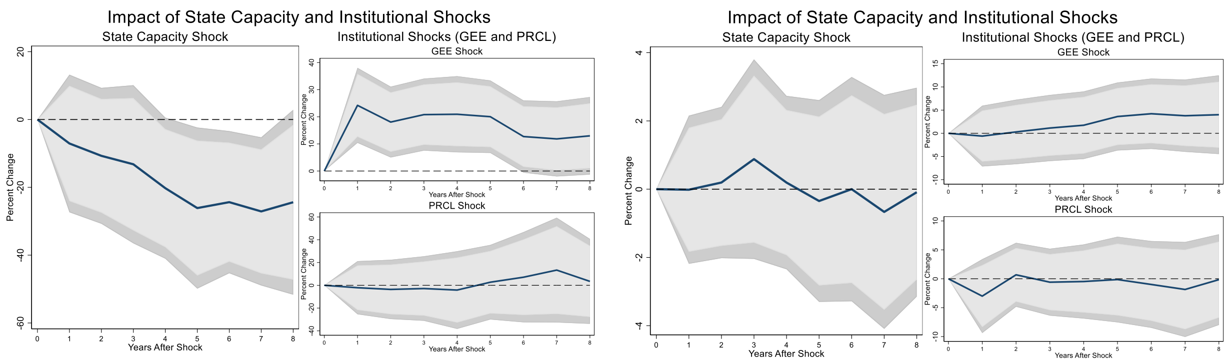
In AEs, investment exhibits a negative and statistically significant response to state capacity shocks in the medium term, while institutional improvements (GEE shocks) have a positive and significant effect. This divergence suggests that in mature institutional settings, increasing state capacity without institutional reform may generate inefficiencies or regulatory overreach, deterring private investment. Such outcomes are consistent with the view that capacity must be coupled with institutional checks and predictability to foster investor confidence (Acemoglu and Robinson, 2012; North, 1990). In contrast, GEE improvements likely enhance regulatory quality and reduce policy uncertainty, thereby encouraging capital formation (Rodrik et al., 2004). Private consumption in AEs shows a positive but borderline significant response to GEE shocks, suggesting that institutional quality, particularly in service delivery and policy stability, may gradually improve household confidence and disposable income. Public consumption, often reflecting the efficiency and targeting of government spending, reacts positively and significantly to both state capacity and GEE shocks, reinforcing the role of strong governance in enhancing the quality of public services and fiscal effectiveness (Alesina et al., 2003; Besley and Persson, 2011). In terms of external trade, state capacity shocks lead to borderline significant declines in both exports and imports. These effects may reflect temporary dislocations or regulatory frictions arising from expanded bureaucratic reach without corresponding institutional reform. Alternatively, they could indicate short-run inefficiencies in trade logistics or policy adjustment costs during the implementation of new governance structures.

In EMDEs, the growth response appears more aligned with institutional gains than state capacity alone. Private consumption responds positively to GEE shocks (borderline significant), consistent with the idea that stronger institutions improve income certainty, reduce inflation volatility, and strengthen social safety nets, factors that support household spending (Rodrik, 2004). The most pronounced effects are observed in trade dynamics. Exports rise significantly in response to both GEE and PRCL shocks, suggesting that improvements in rule of law, transparency, and civil liberties help reduce transaction costs, enforce contracts, and enhance export competitiveness (Frankel and Romer, 1999; La Porta et al., 1999). These reforms may also signal greater political stability and institutional credibility to foreign partners. State capacity shocks, by contrast, lead to a positive and significant increase in imports, likely reflecting improved customs administration, infrastructure, and domestic demand facilitated by stronger governance systems.

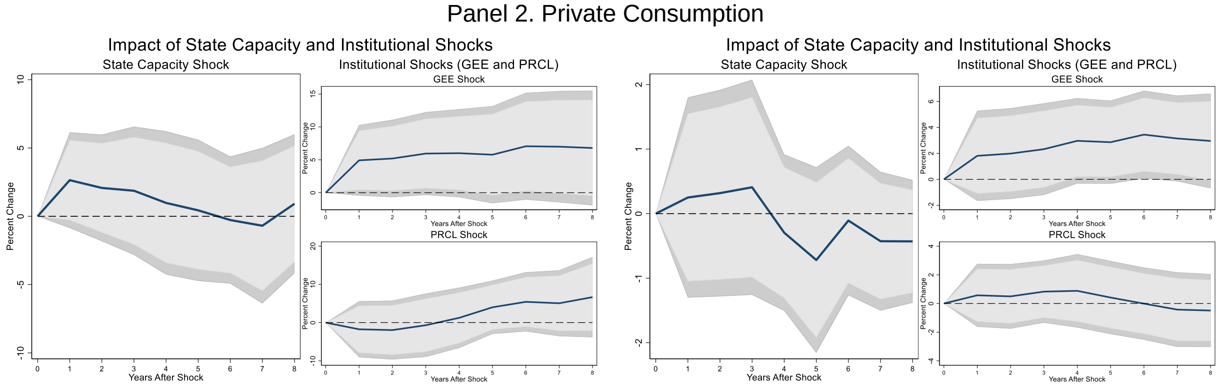
Figure 8. Channels in Local Projections: effect of changes on state capacity and institutional on real GDP components per capita (in percent)

Advanced Economies | *Emerging Markets and Developing Economies*

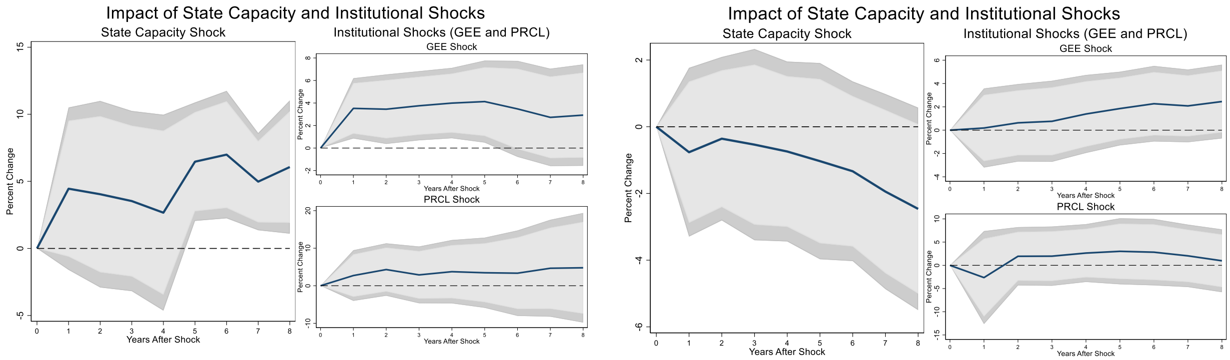
Panel 1. Private Investment



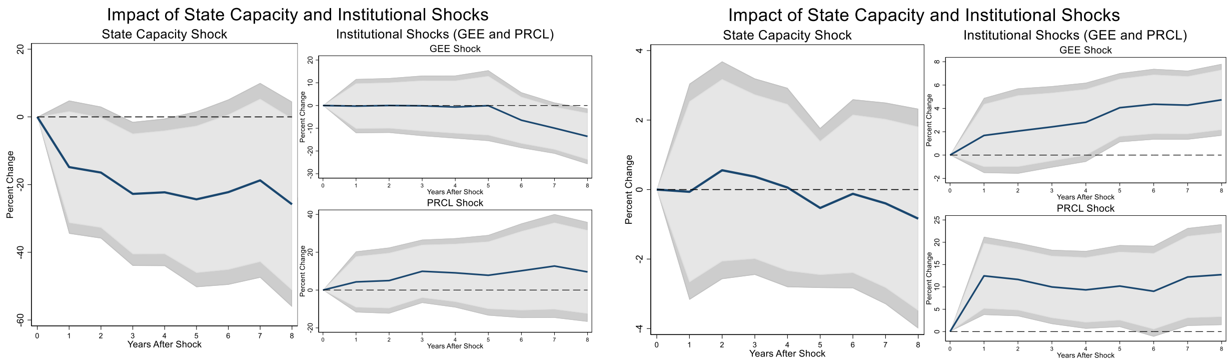
Panel 2. Private Consumption



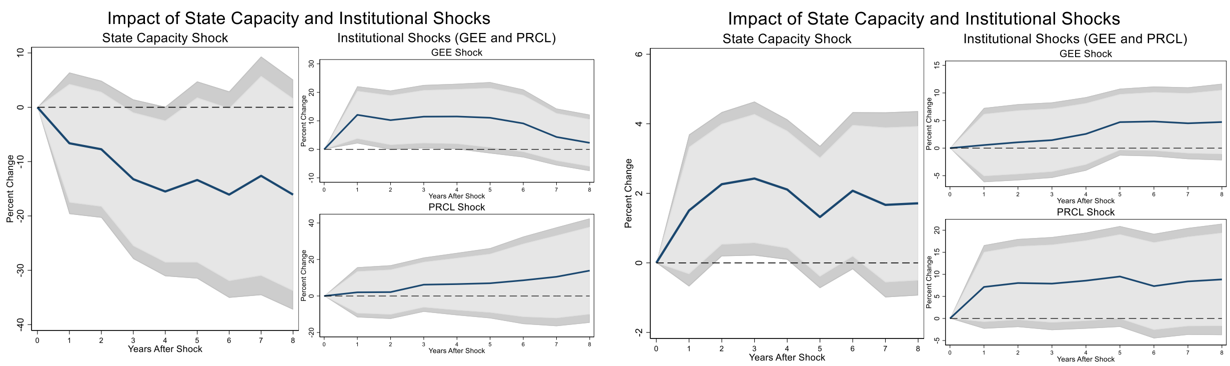
Panel 3. Public Consumption



Panel 4. Exports



Panel 5. Imports



Notes: The figure displays impulse responses of state capacity and institutional shocks on real GDP per capita growth. Year 1 refers to the first year following the occurrence of the shock at Year 0. The solid blue lines represent the estimated responses, with the position at, for example, Year 8 indicating the cumulative change in the log of real GDP per capita eight years after the shock. Dark grey shaded areas denote 90% confidence intervals based on small-sample corrected (SCC) standard errors, while light grey shaded areas indicate 95% confidence intervals. The left panel presents responses to a state capacity shock, whereas the right panels report responses to institutional shocks, distinguishing between government effectiveness (GEE) and political civil liberties (PRCL).

Labor Market

Labor markets represent a critical mechanism through which state capacity and institutional quality are theorized to influence economic development. A capable state is expected to support job creation by enforcing labor laws, promoting workforce training, and providing a stable environment for business expansion (Becker, 1964). Likewise, strong institutions can reduce

hiring frictions, foster fair labor practices, and encourage participation by lowering entry barriers and boosting market inclusiveness (Blanchard and Wolfers, 2000; OECD, 2016).
Yet, empirical results from Appendix Figure A2 suggest more muted and nuanced effects. Across both AEs and EMDEs, shocks to state capacity, GEE, and PRCL show no statistically significant impact on employment or labor force participation (LFP). The only exception is in EMDEs, where PRCL shocks are associated with a positive and significant effect on LFP. This result likely reflects the role of expanded civil liberties in reducing discrimination, increasing legal protections, and empowering underrepresented groups to enter the formal workforce (La Porta and Shleifer, 2008; Rodrik, 2004). Notably, state capacity shocks in both income groups consistently exhibit negative, albeit statistically insignificant, effects on employment and LFP. While not conclusive, this pattern may indicate that the transitional costs of expanding administrative reach, such as stricter enforcement or compliance burdens, can temporarily dampen labor market participation, particularly in the informal sector or in highly regulated environments (Blanchard and Wolfers, 2000).

Economic Stability

Economic stability underpins sustained growth, and effective governance, through strong state capacity and institutional quality, plays a central role in maintaining low inflation and sound public finances. Institutions ensure fiscal discipline and credibility, while state capacity enables the enforcement of policies and the efficient delivery of public services. These elements together help foster an environment conducive to investment, macroeconomic planning, and long-term productivity (Alesina and Perotti, 1996; Tanzi and Schuknecht, 2000).

New results from Appendix Figure A3 show that in advanced economies (AEs), state capacity shocks lead to a statistically significant reduction in both CPI inflation and the fiscal deficit (i.e., improve the overall balance). These findings suggest that improvements in administrative capability contribute to greater macroeconomic stability, likely by enhancing the efficiency of public spending, strengthening tax collection, and reinforcing fiscal control mechanisms. Lower inflation in this context may reflect better regulatory enforcement, reduced inefficiencies, and more predictable policymaking—hallmarks of high-capacity governance (Fischer, 1993).
In addition, government effectiveness (GEE) shocks in AEs are associated with a positive and borderline significant effect on the overall fiscal balance, reinforcing the view that institutional quality supports fiscal prudence by improving budget processes, curbing waste, and increasing policy coherence (Rodrik, 2004; Alesina and Perotti, 1996).

In contrast, for emerging market and developing economies (EMDEs), no statistically significant effects are observed for either inflation or fiscal balance. This may reflect structural challenges such as higher exposure to external shocks, weaker monetary policy frameworks, or limited administrative capacity, which can dampen the impact of governance improvements on macroeconomic outcomes (Fischer, 1993; La Porta et al., 1999).

6.4 Robustness and Sensitivity

Controlling for country-specific time trends

To estimate the causal impact of state capacity shocks on real GDP per capita growth, it is essential to account for pre-existing growth trends that could influence state capacity policy changes. The baseline specification addresses this by including up to two lags of real GDP per capita growth as control variables. To further reduce potential bias, we re-estimate equation (1) with country-specific time trends as additional controls. As shown in Figure A4, the results remain robust, confirming that our main findings are not driven by underlying growth patterns.

Controlling for GDP growth expectations

State capacity policy changes may be implemented because of concerns regarding future economic growth. To address this issue, we control for the expected values in *t-1* of future real GDP growth rates over periods t to *t+k*—that is, the time horizon over which the impulse response functions are computed. These are taken from the fall issue of the IMF World Economic Outlook for year *t-1*. Results shown in Figure A4 reveal that this does not alter the main thrust of our findings.

Bias

Herbst and Johannsen (2024) show that LPs may be biased. The bias is akin to the Nickell bias, but more severe when present in a LP model because the local projection estimates at each forecast horizon no longer can be considered local. The bias is more severe when there is high persistence, i.e., the sum of the coefficients of the lagged dependent variables is higher than 0.9. We have low persistence in most of our models as the sum of the coefficients of the lagged dependent variables is less than 0.5 all specifications when *h=1* (when *h>1* the persistence adds up because we are estimating cumulative growth rates, so the sum of the coefficients of the lagged dependent variables are not directly comparable at *h>1*). Nevertheless, we implement the bias correction proposed Herbst and Johannsen (2024), since the bias also increases with the forecast horizon, h, and shorter time-series dimension t. The results from that estimator are very similar to our previous estimates for eq. (1), as shown in Figure A4. We therefore conclude that our models, due to the generally low persistence, are robust to the bias. We also apply the bias correction to our non-linear LP estimates and find again that the bias is negligible.[17]

Alternative shock definitions

In addition to the residual-based baseline approach, we construct an alternative set of shocks based on the annual change (first difference) of the relevant governance indicators. To better capture relative shifts within each country's historical experience, especially for slow-moving institutional variables, we define a shock as any year when the annual change ranks among the top 10 percent of all observed changes in that country. Formally, for each country, we compute the 90th percentile of the annual change distribution and classify a year as a shock if the change exceeds this threshold. Unlike the baseline binary shocks, these alternative measures retain the magnitude of the underlying change in the governance variable for high-change years. As such, the local projection coefficients are scaled by the average size of the positive governance change that qualifies as a shock, allowing us to express the estimated effects in terms of a typical large institutional shift. This country-specific percentile-based method ensures that shocks reflect unusually large movements relative to each country's own institutional dynamics, which might otherwise be obscured in global thresholds due to differences in volatility.

Figure A5 shows that the dynamic responses using this alternative specification are broadly similar to the baseline results, and the estimated effects are not statistically different. This

[17] These results are available on request.

supports the robustness of our findings and suggests that the original residual-based shocks are not unduly biased by their construction or scaling.

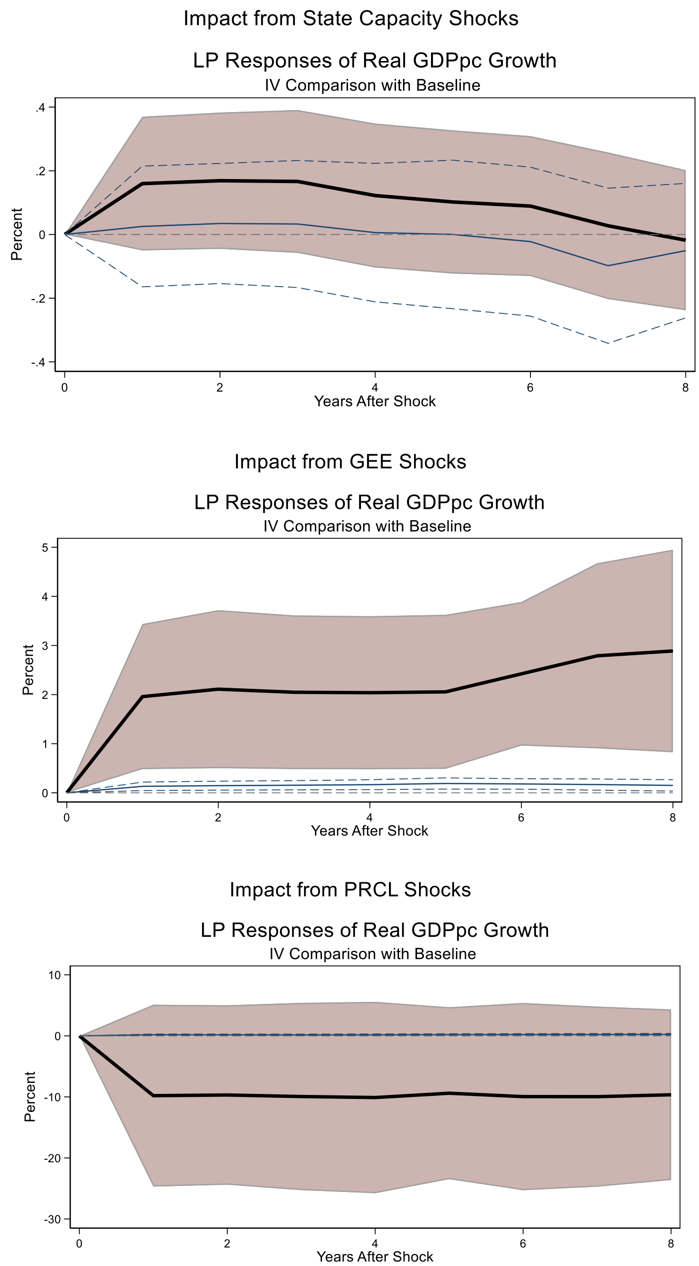
Accounting for potential endogeneity

While our baseline identification strategy—purging predictable components from governance indicators and isolating large, unexpected deviations—provides a significant improvement over raw year-on-year changes, residual endogeneity concerns remain. In particular, reverse causality (e.g., economic growth influencing institutional quality), as well as omitted global or regional shocks, could still bias estimated effects. To further strengthen the causal interpretation of our findings, we complement the baseline approach with a two-pronged instrumental variables (IV) strategy, leveraging plausibly exogenous variation in state capacity and institutional conditions that is orthogonal to contemporaneous domestic economic performance. To instrument state capacity shocks, we use natural disasters, which are plausibly exogenous to short-run economic trends but have documented effects on governance structures. Severe natural disasters often prompt emergency mobilization, administrative reorganization, or broader public sector reforms (Besley and Persson, 2011). We operationalize this approach using natural disasters from the EM-DAT International Disaster Database which focuses on events that result in above-median fatalities within each country.

To instrument institutional quality shocks, specifically changes in government effectiveness (GEE) and political rights and civil liberties (PRCL), we exploit income-group-based democratization dynamics and cross-country institutional diffusion. A well-established literature emphasizes how institutional reform processes are influenced by peer effects, shared development trajectories, and transnational policy spillovers (Huntington, 1991; Acemoglu et al., 2019; Persson and Tabellini, 2009). Countries with similar income levels often face comparable governance challenges, donor conditionalities, and international expectations, which can lead to synchronized institutional trends. Operationally, we construct an external instrument by computing the average annual change in democracy scores, measured via the Polity2 index, for all countries within the same IMF-defined income group (Advanced Economies or Emerging Markets or Low-Income Developing Countries), explicitly excluding the target country. This captures political reform momentum among economic peers while mitigating endogeneity concerns tied to domestic economic or institutional conditions. To the extent that democratization episodes are triggered by global ideological trends, donor-driven governance initiatives, or geopolitical alignment pressures within income cohorts, this instrument isolates plausibly exogenous variation in national institutional reform trajectories.

We apply these instruments in a standard two-stage least squares (2SLS) framework to re-estimate the effects of state capacity, GEE, and PRCL shocks on real GDP per capita growth. First-stage regressions confirm that our instruments are strongly correlated with the governance shocks of interest. Overidentification tests (e.g., Hansen J-tests) do not reject the validity of the instruments, supporting the exclusion restriction. The 2SLS point estimates shown in Figure 9 are not statistically different from their baseline counterparts in most cases, suggesting that endogeneity does not appear to be a major concern with our shock identification strategy. Notably, however, for the GEE shock, the IV estimates reveal a positive and statistically significant GDP per capita growth response that exceeds the upper bound of the baseline confidence interval. This result reinforces the robustness of the economic impact of GEE shocks and suggests that any potential attenuation bias in the baseline estimates likely understated their true effect.

Figure 9. Instrumental Variables in Local Projections: effect of state capacity and institutional changes on real GDP per capita growth



Notes: The solid black lines in the figure plots the impulse responses of a given a shock in a specific variable of interest on real GDP per capita growth. Year=1 is the first year after a shock took place at year=0. So, the position of the line at e.g., year=8 shows the change in the log of real GDP per capita 8 years after the shock. The light pink shaded areas display the 90% SCC error bands. The solid blue line denotes the overall unconditional baseline result displayed earlier in Figure 5 with associated 90% SCC error bands in dotted blue lines.

Further Validation of Shocks Exogeneity

To address potential concerns of endogeneity and institutional foresight, we conduct a series of diagnostic exercises that reinforce the plausibility of our identified shocks (state capacity, GEE, and PRCL) being exogenous to contemporaneous and anticipated macroeconomic conditions. These tests strengthen the credibility of our identification strategy and support the interpretation of the shocks as discretionary, externally driven institutional shifts, rather than automatic responses to cyclical dynamics or domestic policy planning.

- **Granger Non-Causality Tests.** We apply the Dumitrescu and Hurlin (2012) panel Granger non-causality test to examine whether lagged real GDP growth predicts the occurrence of governance-related shocks. Using a balanced panel, we find little consistent evidence that economic growth systematically precedes the onset of state capacity (SC), GEE, or PRCL shocks. While the SC shock shows statistically significant results at conventional levels (e.g., $p < 0.01$ at lags 1 and 2), the lack of similar findings for other institutional measures and across lag structures suggests these results may not reflect a robust causal pattern. For both GEE and PRCL shocks, p-values for the Z-bar and Z-bar tilde statistics are comfortably above standard significance thresholds (e.g., $p = 0.783$ for GEE at lag 1), reinforcing the view that recent macroeconomic performance does not systematically anticipate institutional change.

- **Regressions on Lagged Macro Controls.** We further investigate potential endogeneity concerns by estimating a series of pooled OLS regressions, where each governance shock variable is regressed on lagged GDP growth (lags 1 to 3). As reported in Appendix Table A6, the coefficients on lagged growth are uniformly small and, with few exceptions, statistically insignificant across all shock types. The R-squared values are consistently close to zero, indicating that past output dynamics have limited explanatory power for the timing or occurrence of institutional shocks.

- **Pre-Trends Local Projection Test.** To assess whether governance shocks are anticipated or respond to future expected economic conditions, we conduct a reverse local projection analysis. In this approach, the probability of a governance shock is regressed on future real GDP growth, controlling for lagged fundamentals and fixed effects. Appendix Figure A6 presents the results for each shock type, State Capacity (Panel 1), GEE (Panel 2), and PRCL (Panel 3). Across all panels and forecast horizons, the estimated effects are small and generally statistically indistinguishable from zero, with confidence intervals consistently spanning the zero line. These findings suggest that forward-looking output dynamics do not systematically predict the timing of institutional shocks.

Taken together, these diagnostic tests offer compelling evidence that the identified governance shocks are orthogonal to both lagged and anticipated economic conditions. This reinforces the credibility of our identification strategy and supports the interpretation of these shocks as plausibly exogenous events—likely driven by political transitions, structural reforms, or external pressures rather than endogenous macroeconomic dynamics. As such, the shocks can be credibly treated as causal drivers in our analysis of growth outcomes.

VII. Conclusion and Policy Implications

This paper investigates the distinct and joint effects of state capacity (SC) and institutional quality (IN) on real GDP per capita growth across a panel of up to 130 countries spanning 1970 to 2022. Using local projections (LP), we estimate the dynamic effects of governance shocks over the short and medium term, incorporating nonlinear interactions and exploring multiple identification strategies. SC is measured using the Hanson and Sigman (2021) index, while IN is proxied by two complementary indicators: Government Effectiveness (GEE) from the World Bank's Worldwide Governance Indicators and Political Rights and Civil Liberties (PRCL) from the V-Dem dataset. We construct shocks using two alternative approaches, a residual-based method capturing large unanticipated governance changes, and a percentile-based approach identifying top-decile improvements in governance indicators within each country's historical distribution.

Our findings underscore the importance of nonlinearities and complementarities between SC and IN. Positive shocks to SC and IN have significant and persistent growth effects, particularly in low-income and emerging market economies. Improvements in institutional quality, especially in government effectiveness, generate the strongest and most consistent gains. SC shocks exhibit more modest average effects, but become substantially more powerful when implemented in institutional environments with high rule of law, bureaucratic quality, and accountability. These results highlight the complementarity between governance pillars: IN reforms are most impactful in countries with sufficient administrative capacity, and SC upgrades are more effective when supported by credible institutions. In advanced economies, marginal improvements in governance produce smaller effects and sometimes lead to short-term adjustment costs.

To ensure the robustness of our results, we address potential endogeneity concerns through an instrumental variable (IV) strategy. For SC shocks, we use natural disasters with high fatality rates as plausibly exogenous triggers of state-building efforts. For GEE and PRCL shocks, we exploit regional institutional diffusion by instrumenting with the average change in Polity2 scores among peer countries within the same income group (excluding the country in question). The IV estimates broadly confirm the baseline results. Most notably, for GEE, IV estimates are significantly larger than the baseline, suggesting that attenuation bias may mask the full impact of government effectiveness improvements on growth.

We also explore the transmission mechanisms through which SC and IN influence growth. The clearest and most consistent channel is investment: gross fixed capital formation increases significantly following governance improvements, particularly institutional reforms. These results highlight the importance of stable, predictable policy environments for capital accumulation. Macroeconomic stability also improves with better governance, SC reforms in particular are associated with improved fiscal performance, even though they often involve increased public expenditure. Labor market responses are more heterogeneous: SC shocks are associated with temporary declines in labor force participation, possibly reflecting transitional disruptions during reform efforts. Inflation appears largely unaffected by governance shocks, consistent with the view that monetary dynamics are shaped by broader policy regimes and external factors.

These findings yield several actionable policy insights, depending on a country's institutional and capacity baseline:

- **Advanced Economies (AEs):** Focus on incremental governance improvements that reduce administrative frictions without creating institutional overreach. Digitalization and simplification of regulatory frameworks may yield efficiency gains with minimal disruption.

- **Emerging Market Economies (EMEs):** Prioritize building core administrative capacity and improving policy effectiveness. Institutional reforms should aim to stabilize expectations and reduce legal and regulatory uncertainty to support investment.
- **Low-Income Countries (LICs):** Adopt comprehensive reforms that jointly enhance state capacity and institutional quality. Priority areas include anti-corruption, rule of law, and public service delivery. In Africa and other LIC contexts, governance improvements aligned with regional integration initiatives may amplify their growth effects. Multilateral institutions should support these efforts through tailored technical assistance and sustained capacity-building.

Across all contexts, several general principles emerge:

- **Target Complementarity:** Reforms are most effective when SC and IN are strengthened together, particularly in settings where one dimension is underdeveloped.
- **Focus on Sequencing:** The sequencing of reforms matters. In weak institutional environments, basic rule-of-law reforms may need to precede or accompany administrative overhauls.
- **Adapt to Local Contexts:** Governance reforms must be tailored to a country's unique institutional, historical, and social landscape.
- **Engage Stakeholders:** Broad-based support is critical. Engaging civil society, the private sector, and external partners can increase buy-in and reduce reform resistance.

While this paper provides new empirical evidence and practical insights, several limitations remain. First, our SC measures do not capture fiscal capacity explicitly, limiting our ability to differentiate between administrative efficiency and resource mobilization. Second, while LP methods are well-suited to short- and medium-term dynamics, they may not fully capture long-run effects or structural persistence. Future research could extend this analysis by incorporating explicit fiscal capacity indicators, exploring sectoral heterogeneity, or studying the interaction between governance and external shocks such as climate change, demographic pressures, or global financial cycles.

Annex I.

Table A.1 Descriptive statistics

Variable	Description	Obs.	Mean	S.D.	Min	Max	Source
State Capacity	A measure of a government's ability to effectively mobilize resources, enforce laws, deliver public goods, and implement policies.	2048	0.528	0.943	-2.31	2.96	Hanson and Sigman (2021)
Government Effectiveness	A governance indicator that assesses the quality of public services, the competence of civil servants, the independence of public administration from political pressures, and the credibility of the government in implementing sound policies.	3178	0.497	0.200	0.000	1.000	World Bank Governance Indicators
Political Civil Liberties	A composite index capturing the extent to which individuals enjoy rights such as freedom of expression, association, and access to information, as well as electoral and participatory rights, scaled between 0 (no liberties) and 1 (full liberties).	3993	0.692	0.276	0.024	0.985	V-Dem via Our World in Data
Inflation rate	The annual percentage change in the consumer price index (CPI)	3109	0.016	0.055	-0.802	0.677	IMF
Real GDP per capita growth	The annual growth rate of real GDP per capita, where GDP is adjusted for inflation and divided by the population size	2956	0.049	0.065	-0.184	1.267	IMF
Population growth	The annual percentage change in the population of a country	3146	1.427	1.605	-6.852	19.360	World Bank World Development Indicators
Gross Fixed Capital Formation (GFCF) (%GDP)	The value of investments in physical assets like machinery, infrastructure, and buildings, expressed as a percentage of GDP	2697	24.355	8.377	-3.945	76.782	World Bank World Development Indicators
Trade Openness	The sum of exports and imports as a percentage of GDP.	2790	90.276	54.792	15.281	442.62	World Bank World Development Indicators
Uncertainty Index	A measure of economic policy uncertainty based on media coverage, tax code changes, and forecast dispersion. Reflects the impact of fiscal and regulatory unpredictability on economic activity.	2364	0.192	0.202	0	1.821	Baker, Bloom, and Davis (2016)
Log real GFCF	The natural logarithm of real gross fixed capital formation, where values are adjusted for inflation to reflect the real volume of physical investment.	2462	10.123	2.453	1.156	18.043	World Bank World Development Indicators
Log real Private Consumption	The natural logarithm of real private consumption expenditure, adjusted for	2447	11.054	2.400	5.503	18.367	World Bank World

	inflation, indicating the total real spending by households on goods and services.						Development Indicators
Log real Public Consumption	The natural logarithm of real government consumption expenditure, adjusted for inflation, reflecting public sector spending on goods and services.	2448	9.661	2.386	3.148	17.255	World Bank World Development Indicators
Log real Exports	The natural logarithm of real export values, adjusted for inflation, showing the total volume of goods and services exported by a country.	2458	7.541	1.858	2.625	12.275	World Bank World Development Indicators
Log real Imports	The natural logarithm of real import values, adjusted for inflation, representing the total volume of goods and services imported by a country.	2458	7.716	1.618	3.000	12.099	World Bank World Development Indicators
Log employment	The natural logarithm of total employment, indicating the number of individuals employed in the economy in a logarithmic scale.	2972	15.284	1.816	10.917	20.644	World Bank World Development Indicators
Labor force participation rate	The proportion of the working-age population that is either employed or actively seeking employment, expressed as a percentage.	2972	43.207	13.368	13.834	83.03	World Bank World Development Indicators
Overall Balance (%GDP)	The difference between total government revenues and expenditures, expressed as a percentage of GDP.	2450	-1.8542	4.549	-31.312	19.087	IMF
Log CPI	The natural logarithm of the Consumer Price Index (CPI).	2969	4.633	0.312	3.384	7.791	IMF

Table A.2 Unconditional Local Projections: effect of shocks to state capacity on real GDP per capita growth (in percent) (full sample)

Specification/horizon	(0)	(1)	(2)	(3)	(4)	(5)	(6)
	gdp1	gdp2	gdp3	gdp4	gdp5	gdp6	Gdp7
Regressors	b/se	b/se	b/se	b/se	b/se	b/se	b/se
shock1	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
L.shock1	0.001	0.001	0.001	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
lncpi	-0.005	-0.005	-0.005	-0.003	-0.002	-0.002	-0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
L.lncpi	-0.001	-0.001	-0.000	-0.003	-0.004	-0.005	-0.005
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
L2.lncpi	0.016	0.016	0.015	0.015	0.014	0.015	0.015
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
L3.lncpi	-0.009+	-0.008+	-0.008	-0.007	-0.006	-0.006	-0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
popgr	-0.016***	-0.017***	-0.016**	-0.017**	-0.009***	-0.009***	-0.008***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.002)	(0.002)	(0.002)
L.popgr	0.016**	0.017**	0.016**	0.015*	0.007***	0.007**	0.006**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.003)	(0.003)	(0.003)
L2.popgr	-0.005*	-0.005*	-0.005+	-0.004+	-0.001+	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
L3.popgr	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gfcf_gdp	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
L.gfcf_gdp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L2.gfcf_gdp	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
L3.gfcf_gdp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
open	0.000**	0.000*	0.000*	0.000**	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.open	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L2.open	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L3.open	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
uncertainty	-0.006+	-0.006	-0.006	-0.003	-0.005	-0.005	-0.006+
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
L.uncertainty	-0.005	-0.005	-0.006	-0.005	-0.004	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
L2.uncertainty	0.001	0.000	-0.000	-0.000	-0.001	0.001	0.001
	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
L3.uncertainty	0.005	0.004	0.004	0.005	0.003	0.002	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
F.shock1	0.001	0.002	0.002	0.002	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)

F2.shock1		-0.005**	-0.004**	-0.004**	-0.005**	-0.004**	-0.004**
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
F3.shock1			-0.003	-0.003	-0.004+	-0.004	-0.004
			(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
F4.shock1				0.003	0.002	0.003	0.003
				(0.003)	(0.003)	(0.003)	(0.003)
F5.shock1					-0.001	-0.001	-0.001
					(0.002)	(0.002)	(0.002)
F6.shock1						0.005**	0.005**
						(0.002)	(0.002)
F7.shock1							-0.006*
							(0.003)
c_gdp	0.103	0.094	0.087	0.117	0.201***	0.203***	0.203***
	(0.086)	(0.087)	(0.091)	(0.082)	(0.049)	(0.052)	(0.056)
L.c_gdp	0.029	0.039	0.056	0.022	-0.003	-0.006	-0.009
	(0.036)	(0.038)	(0.048)	(0.039)	(0.034)	(0.035)	(0.034)
Constant	0.031***	0.017**	0.036***	0.020**	0.000	0.032***	0.042***
	(0.008)	(0.007)	(0.007)	(0.008)	(0.000)	(0.007)	(0.007)
Observations	3,826	3,700	3,575	3,451	3,328	3,206	3,085
Number of groups	129	128	126	125	124	123	122
r2_w	0.134	0.136	0.133	0.142	0.162	0.171	0.174

Notes: Estimates of eq. (3). Spatial correlation consistent standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3 Unconditional Local Projections: effect of shocks to GEE on real GDP per capita growth (in percent) (full sample)

Specification/horizon	(0)	(1)	(2)	(3)	(4)	(5)	(6)
	gdp1	gdp2	gdp3	gdp4	gdp5	gdp6	Gdp7
Regressors	b/se	b/se	b/se	b/se	b/se	b/se	b/se
shock2	0.005**	0.005**	0.006**	0.006**	0.007**	0.007**	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
L.shock2	0.002	0.002*	0.002+	0.002+	0.003**	0.004***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lncpi	-0.041	-0.028	-0.018	0.001	-0.007	0.018	0.026
	(0.051)	(0.051)	(0.053)	(0.055)	(0.056)	(0.059)	(0.061)
L.lncpi	-0.010	-0.019	-0.026	-0.043	-0.035	-0.050	-0.054
	(0.042)	(0.042)	(0.042)	(0.044)	(0.046)	(0.048)	(0.049)
L2.lncpi	0.050***	0.052***	0.051***	0.055***	0.054***	0.051***	0.047***
	(0.010)	(0.011)	(0.012)	(0.013)	(0.013)	(0.014)	(0.013)
L3.lncpi	-0.000	-0.001	-0.000	-0.001	-0.001	-0.000	0.002
	(0.006)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
popgr	-0.006***	-0.006***	-0.006***	-0.007***	-0.007***	-0.008***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.popgr	0.006**	0.006**	0.006**	0.006***	0.007***	0.008***	0.007**
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
L2.popgr	0.000	0.000	0.000	-0.000	-0.001	-0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
L3.popgr	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
gfcf_gdp	0.000	0.000	0.000	0.001*	0.001	0.001+	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
L.gfcf_gdp	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L2.gfcf_gdp	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L3.gfcf_gdp	-0.000+	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
open	0.000*	0.000+	0.000+	0.000+	0.000+	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.open	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L2.open	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000+	-0.000+
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L3.open	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
uncertainty	-0.000	0.000	0.000	-0.000	-0.001	-0.001	-0.001
	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)
L.uncertainty	0.004	0.004	0.004	0.002	0.001	0.005	0.002
	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	(0.007)
L2.uncertainty	-0.001	-0.002	-0.003	-0.003	-0.003	-0.007	-0.010*
	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
L3.uncertainty	-0.004	-0.005	-0.005	-0.004	-0.003	-0.002	-0.003
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)
F.shock2	0.003*	0.004**	0.004**	0.004**	0.004**	0.004***	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)

F2.shock2		0.005**	0.006**	0.006***	0.006***	0.007***	0.006**
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
F3.shock2			0.002	0.003**	0.004**	0.005***	0.004**
			(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
F4.shock2				0.003	0.004	0.003	0.002
				(0.003)	(0.003)	(0.003)	(0.003)
F5.shock2					0.002	0.003+	0.002
					(0.002)	(0.002)	(0.002)
F6.shock2						0.006**	0.006***
						(0.002)	(0.002)
F7.shock2							-0.003
							(0.003)
c_gdp	0.221***	0.216***	0.207***	0.190***	0.212***	0.186***	0.171***
	(0.052)	(0.051)	(0.051)	(0.054)	(0.063)	(0.054)	(0.049)
L.c_gdp	0.028	0.020	0.018	-0.018	-0.027	-0.001	0.007
	(0.063)	(0.064)	(0.070)	(0.069)	(0.069)	(0.070)	(0.073)
Constant	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,126	1,072	1,017	962	907	852	797
Number of groups	55	55	55	55	55	55	55
r2_w	0.443	0.448	0.450	0.460	0.472	0.489	0.494

Notes: Estimates of eq. (3). Spatial correlation consistent standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4 Unconditional Local Projections: effect of shocks to PRCL on real GDP per capita growth (in percent) (full sample)

Specification/horizon	(0)	(1)	(2)	(3)	(4)	(5)	(6)
	gdp1	gdp2	gdp3	gdp4	gdp5	gdp6	Gdp7
Regressors	b/se	b/se	b/se	b/se	b/se	b/se	b/se
shock3	0.001	0.000	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
L.shock3	-0.005*	-0.006**	-0.006*	-0.006*	-0.006*	-0.007*	-0.007*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
lncpi	-0.005	-0.004	-0.004	-0.005	-0.005	-0.005	-0.006
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)
L.lncpi	-0.000	-0.002	-0.004	-0.003	-0.002	-0.001	-0.001
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
L2.lncpi	0.015	0.016	0.017	0.017	0.016	0.016	0.016
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
L3.lncpi	-0.009*	-0.008*	-0.009*	-0.009*	-0.009+	-0.008+	-0.008+
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
popgr	-0.013**	-0.013**	-0.014**	-0.014**	-0.015**	-0.015**	-0.015**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
L.popgr	0.013**	0.013**	0.013**	0.013**	0.014**	0.014**	0.014**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
L2.popgr	-0.003	-0.004+	-0.004+	-0.004+	-0.004+	-0.004+	-0.004+
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
L3.popgr	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gfcf_gdp	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.gfcf_gdp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L2.gfcf_gdp	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L3.gfcf_gdp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
open	0.000*	0.000*	0.000*	0.000*	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.open	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L2.open	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L3.open	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
uncertainty	-0.007**	-0.006*	-0.006*	-0.006*	-0.005+	-0.005+	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
L.uncertainty	0.000	-0.001	-0.003	-0.002	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
L2.uncertainty	0.003	0.004	0.002	0.002	0.002	0.002	0.001
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
L3.uncertainty	0.004	0.005	0.004	0.005	0.005	0.005	0.005
	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
F.shock3	-0.006*	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)

F2.shock3		-0.008***	-0.009***	-0.009***	-0.010***	-0.010***	-0.010***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
F3.shock3			-0.001	-0.000	-0.001	-0.001	-0.001
			(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
F4.shock3				-0.002	-0.001	-0.001	-0.001
				(0.002)	(0.002)	(0.002)	(0.002)
F5.shock3					-0.008***	-0.008***	-0.008**
					(0.003)	(0.003)	(0.003)
F6.shock3						-0.003*	-0.002
						(0.002)	(0.002)
F7.shock3							-0.002
							(0.002)
c_gdp	0.120+	0.119+	0.125+	0.119+	0.115	0.109	0.102
	(0.080)	(0.081)	(0.084)	(0.082)	(0.081)	(0.082)	(0.083)
L.c_gdp	0.031	0.032	0.030	0.031	0.035	0.034	0.028
	(0.034)	(0.035)	(0.036)	(0.036)	(0.035)	(0.035)	(0.035)
Constant	0.030***	0.043***	0.034***	0.038***	0.051***	0.052***	0.043***
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	4,719	4,602	4,483	4,360	4,236	4,112	3,985
Number of groups	130	130	130	130	130	130	130
r2_w	0.181	0.186	0.182	0.132	0.134	0.134	0.137

Notes: Estimates of eq. (3). Spatial correlation consistent standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5. Panel Granger Causality Test

Shock	Lag Order	W-bar	Z-bar	p-value (Z-bar)	Z-bar tilde	p-value (Z-bar tilde)
SC	1	1.8197	5.5592	0.0000	4.7482	0.0000
	2	2.9975	4.7840	0.0000	3.7842	0.0002
GEE	1	0.9548	-0.2749	0.7834	-0.8091	0.4185
	2	1.9046	-0.4102	0.6816	-1.2421	0.2142
PRCL	1	1.4245	3.0020	0.0027	2.4880	0.0128
	2	2.2229	1.1147	0.2650	0.5811	0.5612

Note: this table reports results from panel Granger causality tests using the methodology of Dumitrescu and Hurlin (2012), which allows for heterogeneity in causal relationships across countries. The tests examine whether past values of real GDP growth Granger-cause the occurrence of identified shocks. The null hypothesis is that GDP growth does not Granger-cause shocks across the panel of countries. The tests are performed for lag order 1 using a balanced panel. W-bar is the average of individual country-level Wald statistics. Z-bar is the standardized statistic assuming a large number of cross-sections and time periods. Z-bar tilde is the standardized statistic adjusted for small sample bias.

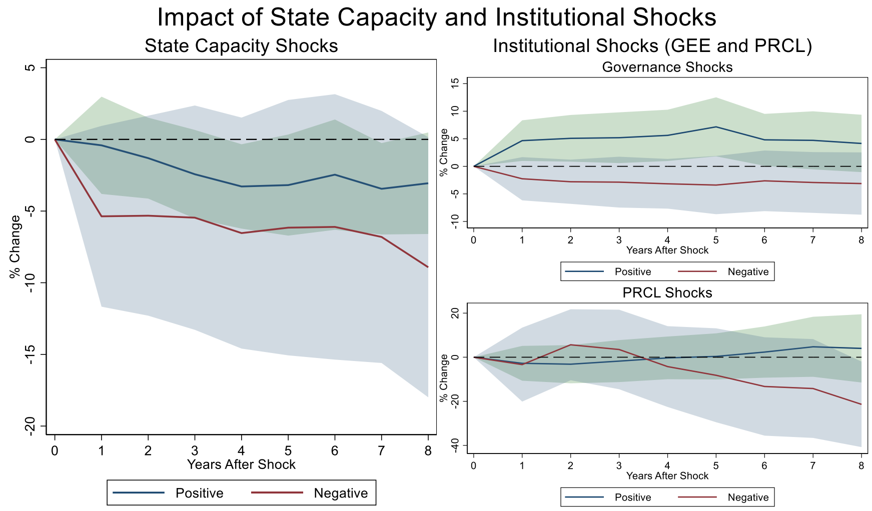
Table A6. Regressions of Shocks on Lagged Macro Controls

Shock	Lag	Obs	R-squared	Coefficient	Std. Err.	t	P>|t|	95% CI Lower	95% CI Upper
SC	L1	5,773	0.000	-0.001	0.001	-1.110	0.266	-0.002	0.001
SC	L2	5,632	0.002	-0.002	0.001	-3.560	0.000	-0.004	-0.001
SC	L3	5,489	0.000	0.000	0.001	0.310	0.757	-0.001	0.002
GEE	L1	1,833	0.001	0.002	0.002	0.990	0.322	-0.002	0.007
GEE	L2	1,824	0.000	0.001	0.002	0.330	0.743	-0.004	0.005
GEE	L3	1,815	0.001	0.004	0.002	1.590	0.112	-0.001	0.008
PRCL	L1	7,345	0.002	-0.002	0.001	-3.950	0.000	-0.003	-0.001
PRCL	L2	7,178	0.000	-0.000	0.001	-0.740	0.462	-0.001	0.001
PRCL	L3	7,011	0.000	0.000	0.001	0.540	0.588	-0.001	0.001

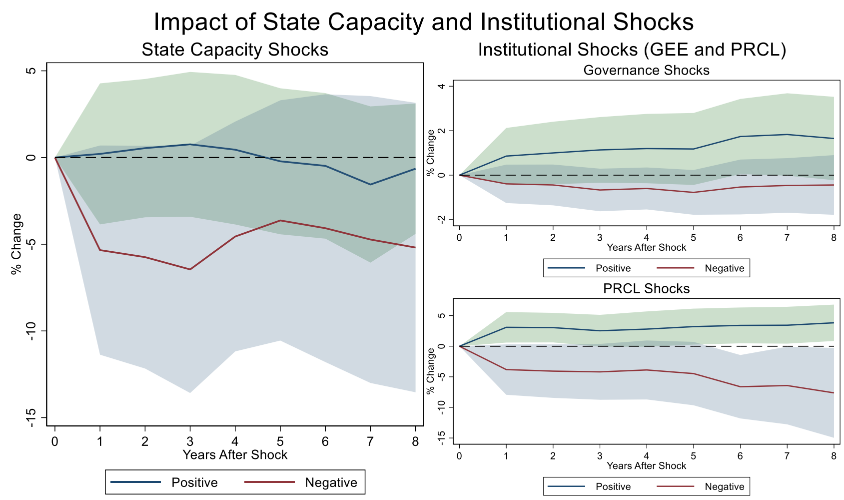
Note: this table presents results from regressions testing whether the occurrence of identified shocks is systematically predicted by recent macroeconomic conditions. Specifically, we regress shock variables on lagged GDP growth (up to three lags) using multiple estimation strategies. The table reports results from Pooled OLS estimated separately for different lags (L1, L2, and L3). Each regression includes one lag of real GDP growth at a time.

Figure A1. Symmetry in Unconditional Local Projections: effect of state capacity and institutional changes on real GDP per capita growth (in percent) (full sample)

Panel 1. Advanced Economies



Panel 2. Emerging Markets and Developing Economies

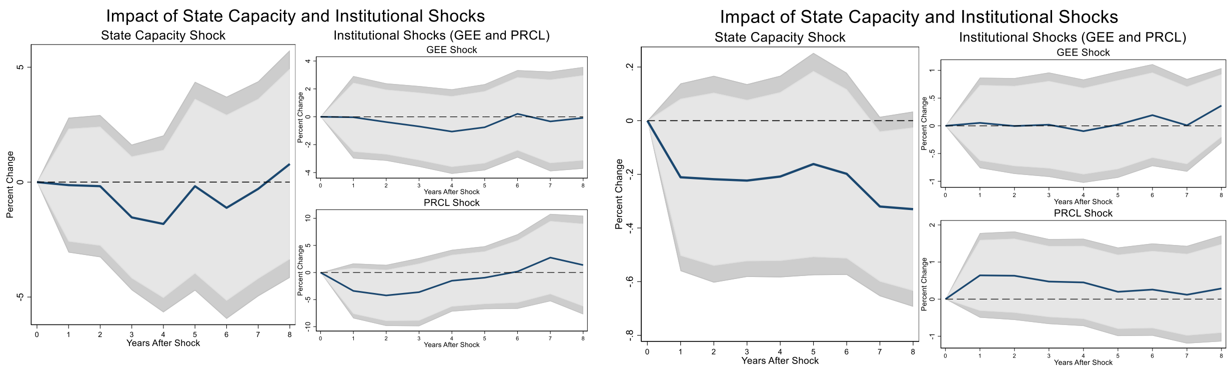


Notes: The figure displays impulse responses of positive and negative shocks to state capacity and institutional quality on real GDP per capita growth. Year 1 refers to the first year following the occurrence of the shock at Year 0. Solid blue lines represent the estimated responses to positive shocks, with green shaded areas denoting the 90% (darker) and 95% (lighter) confidence intervals. Solid red lines depict the estimated responses to negative shocks, with blue shaded areas indicating the 90% and 95% confidence intervals. The value shown at, for example, Year 8 reflects the cumulative change in the log of real GDP per capita eight years after the respective shock. The left panel shows responses to a state capacity shock, while the right panels report responses to institutional shocks, disaggregated into government effectiveness (GEE) and political rights and civil liberties (PRCL). All confidence intervals are based on small-sample corrected (SCC) standard errors.

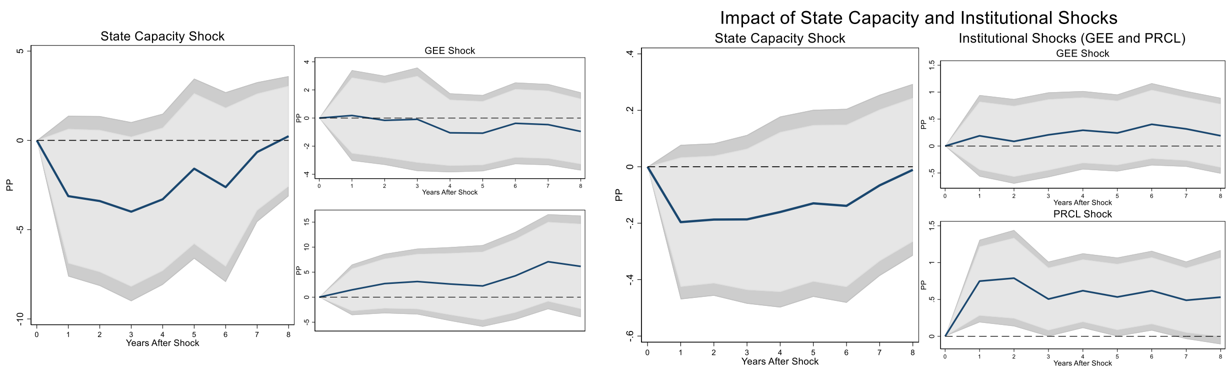
Figure A2. Channels in Local Projections: effect of state capacity and institutional changes on employment and labor force participation

Advanced Economies | *Emerging Markets and Developing Economies*

Panel 1. Employment (%)



Panel 2. Labor Force Participation rate (pp.)

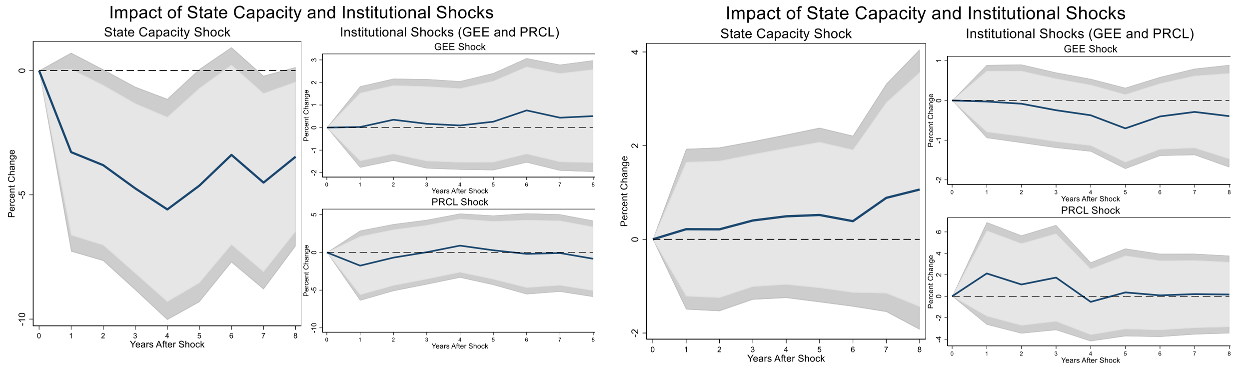


Notes: The solid black lines in the figure plots the impulse responses of state capacity shocks on two labor market proxies. Year=1 is the first year after a shock took place at year=0. The dark grey shaded areas display the 90% SCC error bands; the light grey shaded areas display the 95% SCC error bands.

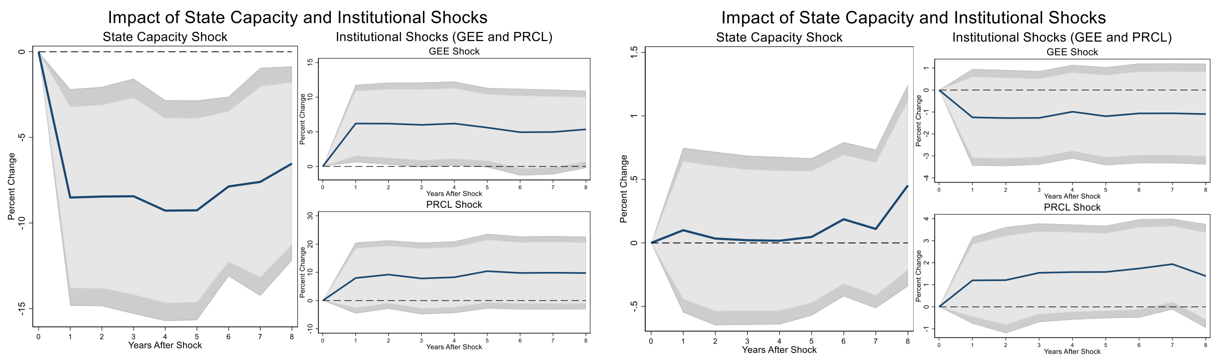
Figure A3. Channels in Local Projections: effect of state capacity and institutional changes on prices and the overall balance

Advanced Economies | *Emerging Markets and Developing Economies*

Panel 1. Inflation (%)

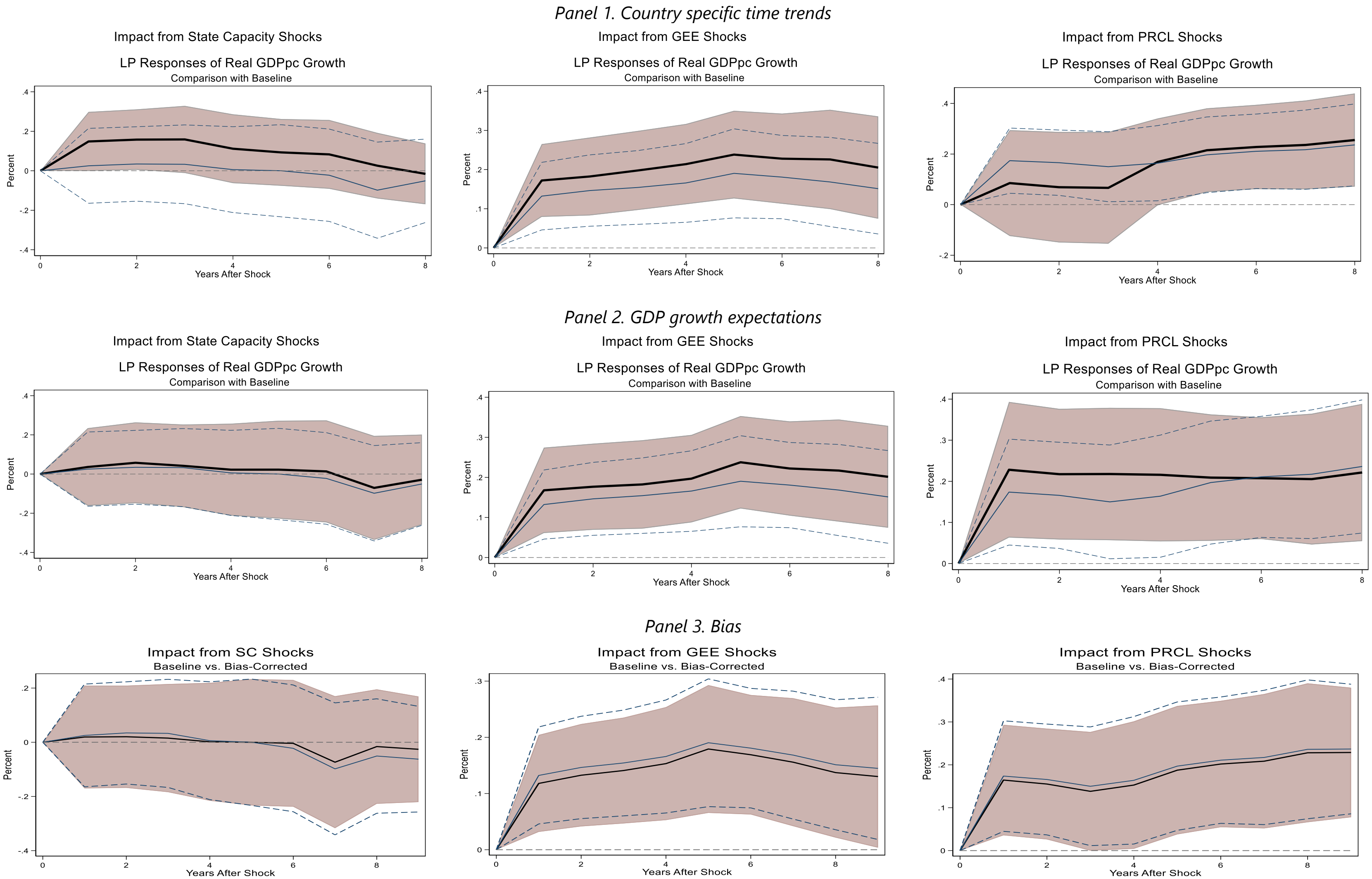


Panel 2. Overall Balance (pp. GDP)



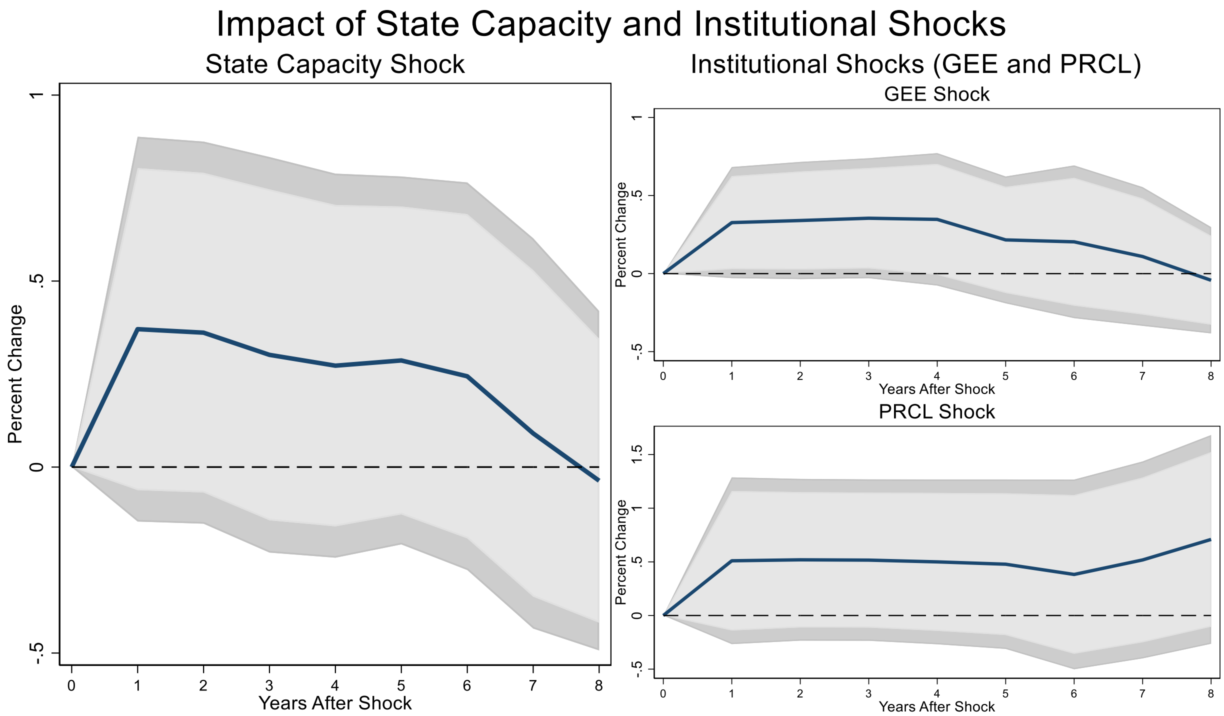
Notes: The solid black lines in the figure plots the impulse responses of shocks on two macroeconomic stability proxies. Year=1 is the first year after a shock took place at year=0. The dark grey shaded areas display the 90% SCC error bands; the light grey shaded areas display the 95% SCC error bands.

Figure A4. Sensitivity in Local Projections: effect of state capacity and institutional shocks on real GDP per capita growth



Notes: The solid black lines in the figure plots the impulse responses of a given shock in a specific variable of interest on real GDP per capita growth. Year=1 is the first year after a shock took place at year=0. So, the position of the line at e.g., year=8 shows the change in the log of real GDP per capita 8 years after the shock. The light pink shaded areas display the 90% SCC error bands. The solid blue line denotes the overall unconditional baseline result displayed earlier in Figure 5 with associated 90% SCC error bands in dotted blue lines.

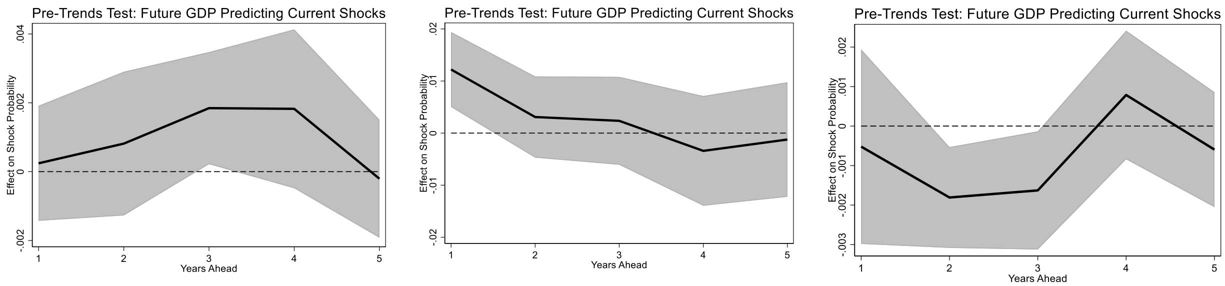
Figure A5. Alternative shock definitions: Unconditional Local Projections: effect of state capacity and institutional changes on real GDP per capita growth (in percent) (full sample)



Notes: The solid black lines in the figure plots the impulse responses of shocks on real GDP per capita growth. Year=1 is the first year after a shock took place at year=0. The dark grey shaded areas display the 90% SCC error bands; the light grey shaded areas display the 95% SCC error bands.

Figure A6. Pre-Trends Test: Future GDP Predicting Current Shocks

Panel 1. State Capacity | Panel 2. GEE | Panel 3. PRCL



Note: This figure reports the results of a reverse local projection (pre-trends) test assessing whether future macroeconomic conditions predict the contemporaneous occurrence of shocks. Specifically, the first difference of the MP shock is regressed on future values of real GDP growth (1 to 5 years ahead), controlling for lagged GDP growth, lagged shocks, lagged public debt-to-GDP, lagged consumer price inflation, and year fixed effects. The solid line shows the estimated coefficients on future GDP growth at each horizon, and the shaded region depicts 90 percent confidence intervals with standard errors clustered at the country level.

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