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**Driving Green Growth: Spanish Foreign
Direct Investment in Latin American
Renewable Energy
A Comparative Study of Chile and Mexico**

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Any errors or omissions that remain in this dissertation are entirely my own.

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Abstract

Between 2015 and 2023, Spanish renewable energy investment produced very different outcomes in Chile and Mexico. Both countries share comparable resource endowments, similar macroeconomic profiles, and exposure to the same Spanish multinational investors, principally Iberdrola, Acciona Energía, Naturgy, and Endesa Enel. Yet, the two trajectories diverged sharply. This dissertation aims to explore the reasons behind this divergence. Drawing on Dunning's (1980, 2015) Eclectic (OLI) Paradigm, North's (1990) New Institutional Economics, and Liberal Institutionalism, the study argues that the answer lies in institutional quality. For the analysis, three governance dimensions are tracked: regulatory quality (RQ), government effectiveness (GE), and rule of law (RL), all measured through the World Bank Worldwide Governance Indicators. Variation across these three dimensions is the primary factor explaining the divergent renewable capacity outcomes observed in Chile and Mexico.

The empirical analysis uses a quantitative comparative design that combines descriptive statistics with panel regression, estimating six specifications. Model 1 is a pooled OLS regression with a WGI composite index. Model 2 replaces the composite with the three disaggregated WGI components (RQ, GE, and RL). Model 3 adds an energy demand control. Model 4 introduces country fixed effects, Model 5 adds the energy demand control to the country fixed effects specification, and Model 6 adds year fixed effects alongside country fixed effects to absorb both country and time heterogeneity. The results show that Chile expanded installed renewable capacity from 9.7 GW to 22.1 GW (a 128% increase), with renewables reaching roughly 63% of the electricity mix by 2023 to 2024, supported by a self-renewing auction-based investment pipeline. Mexico recorded a comparable absolute increase (17.4 GW to 33 GW; about 90%), yet renewables accounted for only 28% of electricity generation. Regulatory reversals from 2018 onward eroded the active investment pipeline. In the two-way fixed effects specification (Model 6), rule of law is the dominant governance channel ($\beta = +0.778$, $p = 0.007$), while government effectiveness is the binding constraint in the country fixed effects models (Models 4 and 5). The composite WGI specification is imprecise and statistically insignificant, which underlines the value of disaggregation for policy-relevant inference.

The study makes three contributions. For International Relations and International Political Economy, it provides micro founded evidence that renewable energy FDI

effectiveness depends on institutional quality. For the renewable energy finance literature, it documents the investment pipeline mechanism through which institutional decline affects capacity outcomes with a three-to-five-year lag. For the comparative political economy of Latin America, it quantifies Mexico's governance trajectory and links it directly to renewable capacity outcomes.

Keywords: foreign direct investment, renewable energy, institutional quality, Chile, Mexico, governance, OLI paradigm, energy transition.

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Chapter One

1. Introduction

Foreign direct investment (FDI, hereafter) has shaped Latin America's economic transformation for decades. FDI does more than top up domestic capital, it also helps governments work around three persistent constraints: low domestic savings, shallow financial markets, and chronic infrastructure gaps. These have limited the scale of long-term public investment, which has pushed governments to rely on foreign capital as a structural feature of regional development (Organization for Economic Cooperation and Development [OECD], 2023).

Foreign investment has spread across several strategic sectors in Latin America, including energy, manufacturing, telecommunications, mining, and financial services (Economic Commission for Latin America and the Caribbean [ECLAC], 2024). These sectors have drawn foreign capital for decades, but the past ten years stand out for the scale of investment moving into renewable energy. In this context, two forces drive the shift: global decarbonization pressure and falling technology costs. Together, they have made clean energy projects commercially viable in emerging markets (Jaumotte et al., 2024). ECLAC reports that energy related investment has grown sharply across the region, and in 2024 renewable energy projects accounted for roughly 38% of all announced FDI projects (ECLAC, 2024).

This investment surge has unfolded alongside a broader shift in the regional energy landscape. Latin America now generates more than 60% of its electricity from renewable sources, which makes its grid one of the cleanest in the world (International Energy Agency [IEA], 2023). Within the renewable mix, hydropower has historically been the anchor; but the most dynamic changes of the past decade have come from solar and wind. The International Renewable Energy Agency (IRENA, 2024) reports that installed solar photovoltaic (PV) capacity rose from roughly 5 gigawatts (GW) in 2015 to more than 60 GW by 2023, while wind capacity more than doubled over the same period. This trend is explained by three forces: cheaper technology, better access to project finance, and broader participation by international developers and investors in large scale renewable projects (OECD, 2023).

Nonetheless, this regional momentum has not translated evenly across countries. Renewable energy development and the share of foreign investment vary widely from one national context to the next. Regarding solar and wind deployment, Chile, Brazil, and

Uruguay lead the region, posting some of the fastest growth rates in the world and capturing a disproportionate share of renewable investment (IEA, 2023). For instance, Chile expanded its non-conventional renewable installed capacity from roughly 4 GW in 2015 to nearly 22 GW by 2024. That year, non-conventional renewables, which include wind, solar, and biofuels, accounted for 59% of total electricity generation (Comisión Nacional de Energía [CNE], 2024). For its part, Mexico's total renewable installed capacity grew from 17.4 GW in 2015 to 34 GW in 2024. Yet, renewables still cover only about 28% of the domestic electricity mix, with natural gas supplying more than 50% (IRENA, 2024; Mexico Business News, 2024). The same gap shows up in the geography of investment announcements: Chile and Brazil consistently capture the largest share of regional greenfield projects in solar and wind (ECLAC, 2024).

Most capital flowing into Latin American renewable projects comes from outside the region. European and North American investors dominate financing and project development (ECLAC, 2024). Among the utilities, infrastructure funds, and developers active in the region's clean energy markets, European firms feature most prominently (ECLAC, 2024). Within this European presence, Spain stands out. Álvarez et al. (2025) report that Spain is one of the largest European investors in Latin America, and that Latin America is in turn Spain's most important destination for outward FDI outside the European Union. This relationship is anchored by four Spanish multinationals: Iberdrola, Acciona Energía, Naturgy, and Endesa Enel. They have built extensive renewable portfolios across the region, developing large solar and wind projects in Chile, Mexico, Brazil, Colombia, and Peru. They typically operate as lead developers or long-term asset owners rather than as short term financial investors (Álvarez et al., 2025; Acciona, 2023). This long-standing investment relationship has extended directly into the renewable sector, where Spanish firms are now major developers and operators of solar and wind projects across multiple Latin American countries.

The literature identifies several factors that help explain why certain Latin American markets have attracted renewable energy investment more consistently than others. At the regional level, high-quality solar and wind resources, growing electricity demand, and the presence of auction-based or long-term contracting mechanisms that enhance project bankability are commonly cited as central drivers of investor interest (IEA, 2023).

At the country level, institutional and regulatory environments create larger divergences. Chile's renewable expansion has run on an investment climate that investors describe as transparent and predictable, especially in the design of electricity markets and

renewable procurement (OECD, 2023). Chilean solar PV capacity alone grew from near zero in 2010 to more than 7 GW by late 2024, driven by the Atacama Desert's extraordinary solar irradiation and supported by a competitive auction system (CNE, 2024; IEA, 2023). In this sense, Mexico shows a sharp contrast. Despite resource endowments that match or exceed Chile's in some respects, Mexico has posted uneven investment trajectories. Particularly, after 2018 when regulatory changes introduced uncertainty about market rules and the role of private developers relative to the state utility (IEA, 2023; Secretaría de Energía [SENER], 2023). Mexican solar capacity grew from 295 megawatts (MW) in 2015 to nearly 12 GW in 2024, an increase of close to 4,000%. Yet solar still supplies under 8% of Mexico's electricity. These numbers point to structural constraints that continue to limit renewable penetration even as capacity additions accelerate (Mexico Business News, 2024). At the regional scale, Latin America's growing role in global supply chain reconfiguration and nearshoring has further raised investor interest in energy, infrastructure, and sustainability linked projects (Maloney, 2024).

Latin America's renewable energy landscape has two faces. On one side, the region offers some of the world's most attractive conditions for renewable generation. It combines abundant natural resources, rising investment interest, and a fast-expanding clean energy portfolio (IEA, 2023; IRENA, 2024). On the other side, the translation of that potential into installed capacity is highly uneven across countries, producing sharply divergent deployment trajectories within the same region (ECLAC, 2024). The coexistence of dynamic and constrained renewable markets makes the region a natural setting for comparative analysis. In this dissertation, that heterogeneity is the analytical anchor. Chile and Mexico are two economically significant Latin American markets with strong renewable resource endowments and a long history of foreign investor participation. Their renewable deployment outcomes diverge sharply. The gap does not trace back to resources. It traces back to differences in institutional frameworks and regulatory trajectories (Natorski and Solorio, 2023; IEA, 2023; CNE, 2024; SENER, 2023). Spanish renewable energy firms are active in both countries on a substantial and sustained basis. This presence makes this divergence an ideal case for examining how foreign investment, and Spanish renewable investment in particular, interacts with national contexts to produce different renewable capacity outcomes (Álvarez et al., 2025; Acciona, 2023).

1.1 Research Question and Objectives

This dissertation addresses the following research question:

Which institutional, regulatory, and market design factors have shaped Spanish renewable energy investment in Chile and Mexico, and how have these factors translated into differences in renewable capacity growth between 2015 and 2023?

In pursuit of this question, the study follows these specific objectives:

(i) to compare Spanish foreign direct investment in renewable energy in Chile and Mexico between 2015 and 2023;

(ii) to analyze how differences in institutional and regulatory environments influence renewable capacity outcomes in both countries; and

(iii) to identify policy relevant institutional features that support effective and sustained renewable energy investment.

To address these questions, the dissertation is organized into five chapters. Chapter 1 introduces the research context, outlines the relevance of foreign direct investment in renewable energy in Latin America, and presents the research question and objectives. Chapter 2 reviews the relevant academic literature and develops the theoretical and conceptual framework, with particular attention to International Relations (IR) and International Political Economy (IPE) theories of foreign investment and to the role of institutional quality in conditioning investment effectiveness. Chapter 3 describes the methodology and data sources, detailing the comparative research design, the variables, and the analytical approach. Chapter 4 presents the empirical findings, comparing investment patterns, institutional environments, and renewable capacity outcomes in Chile and Mexico. Chapter 5 summarizes the main findings, discusses their implications for policymakers and investors, and identifies the study's limitations and directions for future research.

Chapter Two

2. Theoretical and Conceptual Framework

This chapter establishes the theoretical and conceptual foundations for the analysis of Spanish foreign direct investment in Latin American renewable energy. Section 2.1 situates the dissertation within four relevant IR and IPE theoretical traditions: Liberal Institutionalism, Structuralism and Dependency Theory, the Eclectic (OLI) Paradigm, and

New Institutional Economics. In this way, we establish the theoretical lenses through which the relationship between institutional environments and FDI effectiveness is examined. Section 2.2 provides the conceptual framework and literature review, introducing the key concepts that structure the analysis and reviewing the empirical literature on FDI effectiveness, institutional quality, renewable energy investment, and energy transitions in Latin America, culminating in the identification of the research gap this dissertation addresses.

2.1 Theoretical Framework

Before reviewing the empirical literature, it is useful to place this dissertation within the theoretical traditions that shape the study of foreign investment in International Relations (IR) and International Political Economy (IPE). These traditions do not treat FDI as a purely economic phenomenon. Investment decisions, outcomes, and effects depend on political, institutional, and structural factors at both the national and international level. Four theoretical perspectives matter for the questions raised in this study.

The first is liberal institutionalism. The theory holds that international institutions, norms, and rules help states cooperate and lower the transaction costs and uncertainties of cross border economic activity (Keohane & Martin, 2003). From this perspective, the regulatory frameworks that govern FDI, such as bilateral investment treaties, international arbitration mechanisms, and multilateral energy governance arrangements, build the conditions under which investors can commit capital over long horizons with greater confidence in contract enforcement and policy continuity. Applied to renewable energy investment, this perspective highlights two questions: how closely host-country institutions align with international standards and investor expectations, and to what extent regulatory credibility lowers perceived political risk (Jaumotte et al., 2024).

The second perspective is structuralism and dependency theory. It offers a contrasting lens that focuses on the asymmetric power relations between capital exporting and capital receiving economies (Cardoso and Faletto, 1979). In the Latin American context, the tradition asks a critical question: does FDI generate real developmental benefits for host countries, or does it serve mainly the interests of foreign investors and their home states? Applied to Spanish renewable energy investment in Chile and Mexico, the perspective forces two questions. First, does foreign capital contribute to a structural transformation of national energy systems, or does it reinforce existing dependencies? Second, how do regulatory frameworks shape the distribution of benefits between foreign investors and host economies?

The third and central framework is Dunning's eclectic paradigm, also known as the OLI framework (Dunning, 1980, 2015). The framework explains why multinational firms internationalize through three sets of advantages. Ownership advantages are firm specific and include proprietary technologies, managerial capabilities, and access to finance. Location advantages come from the host country and include resource endowments, market characteristics, and institutional conditions. Internalization advantages make FDI more efficient than licensing or contractual arrangements. For this dissertation, the OLI framework offers a structured way to examine why Spanish renewable energy firms have invested in Latin America and why their investment experiences differ across Chile and Mexico. Differences in location advantages, particularly in institutional quality, regulatory stability, and market design, are expected to play the central role in explaining cross country variation in investment effectiveness and renewable capacity outcomes.

The fourth perspective draws on institutional economics, particularly the work of North (1990). North defines institutions as "the rules of the game in a society," the humanly devised constraints that shape political, economic, and social interaction. Institutional change, for North, is incremental and path dependent. Current institutional arrangements reflect historical trajectories and are hard to reverse quickly. The perspective is especially useful for understanding why Chile and Mexico have built such different regulatory frameworks for renewable energy despite comparable resource endowments and similar exposure to global investment flows. It also reinforces the central argument: institutional quality is not a static background feature of host economies. It is a dynamic, context specific determinant of investment effectiveness (Jude and Levieuge, 2015; Chen and Jiang, 2023).

Together, the four perspectives provide the analytical frame for the dissertation. Liberal institutionalism and the OLI framework guide the analysis of how institutional and regulatory conditions shape investor behavior and FDI location decisions. Dependency theory and structuralism keep the analysis attentive to power, distributional outcomes, and the developmental implications of foreign investment. Institutional economics anchors the treatment of institutional quality as a historically contingent and analytically active conditioning variable across the empirical chapters.

2.2 Conceptual Framework

2.2.1 Foreign Direct Investment, Institutions, and Investment Effectiveness

The academic literature on foreign direct investment has evolved considerably in its understanding of how foreign capital relates to host country development outcomes. Early development theories generally portrayed FDI as an inherently positive force that supports growth through capital accumulation, productivity spillovers, technology transfer, and the diffusion of know-how, particularly in capital-scarce developing economies (Bruno et al., 2018). Within this perspective, the local context played a limited analytical role, as foreign capital was assumed to generate positive outcomes largely by virtue of its presence, regardless of institutional or governance conditions (Jude and Leveuge, 2015).

Empirical evidence from the past two decades has challenged this assumption. A growing number of studies show that FDI outcomes vary widely across countries and sectors. Similar volumes of investment can produce very different economic effects (Naseem et al., 2021). Technology transfers and productivity spillovers are the most uneven of all, as their results depend heavily on the institutional quality and governance structures of the recipient country (Newman et al., 2015). Recent literature has shifted accordingly. Rather than treating FDI as a uniformly beneficial flow, recent work asks under what conditions foreign capital becomes development enhancing (Chen and Jiang, 2023). In this sense, the focus has moved from inflow volumes to the effectiveness of foreign investment, which itself now requires explanation.

Institutional quality has become a central area to explore in this discussion. A growing body of research treats it as the conditioning factor for investment effectiveness. Rather than focusing on the size of foreign capital inflows alone, recent work examines how governance structures, regulatory quality, and policy credibility shape the capacity of host economies to turn foreign investment into sustained productive outcomes (Kaufmann et al., 2011). Moreover, the absorptive capacity of domestic firms is relevant. Their ability to recognize, assimilate, and apply external knowledge is itself a critical conditioning factor (Cohen and Levinthal, 1989). Cohen and Levinthal (1994) show that organizations with prior institutional preparation are better placed to capture benefits from external capital and knowledge inflows. Governance is not a passive background characteristic. It is an active determinant of the returns to foreign investment. The conceptual relationships among these elements are mapped below in Figure 1 and explained briefly in Table 1 .

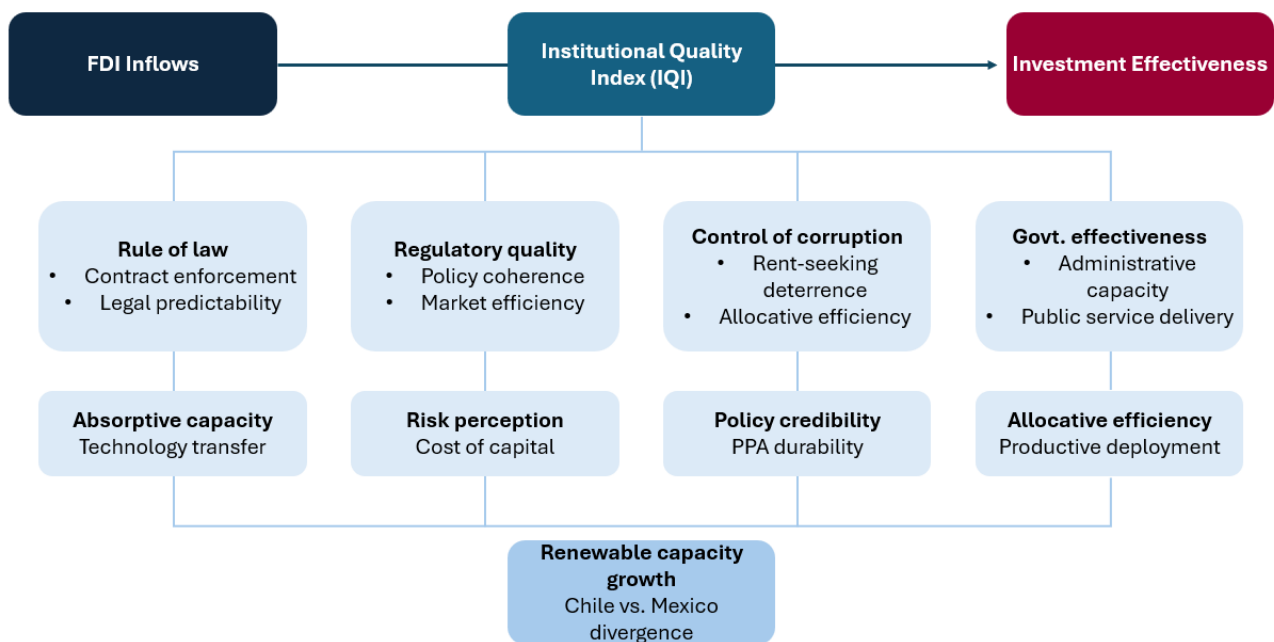


Figure 1. Institutional channels linking foreign direct investment to investment effectiveness (Developed by the author)

Institutional channel	Mechanism	Effect on FDI effectiveness	Key literature
Regulatory quality	Quality of policy formulation, market-friendly rules, and predictability of regulation	Lowers perceived regulatory risk; supports project bankability and continuity	Kaufmann et al. (2011); OECD (2023)
Rule of law	Contract enforcement, property rights protection, judicial independence	Reduces expropriation and contract-breach risk; lengthens viable investment horizons	North (1990); Jude and Levieuge (2015)
Government effectiveness	Administrative capacity, policy implementation, public-service quality	Improves project execution speed, permitting, and grid integration	Chen and Jiang (2023); Halldén et al. (2025)

Control of corruption	Limits on rent-seeking and capture of regulatory processes	Reallocates capital from rent extraction toward productive investment; raises spillover capture	Mehlum, Moene and Torvik (2006); Farzanegan (2014)
Absorptive capacity (institutional)	Prior governance preparation that enables host economies to assimilate foreign capital and know-how	Strengthens technology transfer, supply-chain linkages, and productivity spillovers	Cohen and Levinthal (1989, 1994); Crespo and Fontoura (2007)

Table 1. Institutional channels linking foreign direct investment to investment effectiveness¹

Jude and Leveigue (2015) make this point directly. Using panel data for 94 developing countries across Sub-Saharan Africa, Latin America, and Asia, they show that the growth effects of FDI depend on the institutional environment. In countries with weak institutions, foreign investment fails to generate meaningful productivity gains. It can even add to macroeconomic volatility. The pattern supports a threshold interpretation: FDI becomes growth enhancing only once a minimum level of institutional quality is reached. Latin America illustrates this directly. Countries with stronger rule of law scores and more transparent regulatory frameworks have consistently outperformed institutional laggards in turning FDI into renewable capacity growth. The clearest case is the gap between Chile and Mexico. While Chile ranks among the region’s highest performers on the World Bank’s Rule of Law indicator, Mexico scores considerably lower on the same measure (ECLAC, 2024; World Bank, 2024).

This conditional logic is reinforced by broader political economy research on the incentive effects of weak governance. Mehlum, Moene, and Torvik (2006) analyze the resource curse and argue that the impact of capital inflows depends on whether institutions are inclusive or predatory. In weak institutional settings, incentives tilt toward rent seeking rather than productive activity, which limits long term development gains. The literature focuses on natural resource revenues, but the mechanism extends to capital intensive sectors

¹ Author's elaboration based on the cited literature. The four channels correspond to the composite institutional construct adopted in the empirical chapter, which combines indicators of regulatory quality, rule of law, government effectiveness, and control of corruption drawn from the World Bank's Worldwide Governance Indicators (Kaufmann et al., 2011).

such as energy, where large rents and long project lifecycles raise exposure to governance risks (Farzanegan, 2014).

Building on these insights, scholars have moved beyond threshold arguments to examine the specific mechanisms through which institutions affect FDI outcomes. Chen and Jiang (2023) report that institutional quality not only attracts higher levels of foreign investment but also enhances its economic effectiveness through mediating and moderating channels. Stronger governance improves allocative efficiency, reduces uncertainty, and facilitates technology absorption, thereby strengthening the productivity impact of foreign capital. This dual role of institutions, both as an attractor of capital and as a determinant of its effectiveness, has become central to contemporary debates on high-quality and green foreign direct investment (Jaumotte et al., 2024).

Within this framework, institutional quality is not a passive background characteristic. Governance structures shape investor incentives, influence risk perceptions, and affect the expected returns of long-term projects (North, 1990). When regulatory rules are unstable, rule of law is weak, or policy shifts unpredictably, foreign investors respond in three ways: they limit exposure, they delay project execution, or they move capital to less productive uses (Halldén et al., 2025). The opposite is also true, credible and stable institutional frameworks support sustained investment, reinvestment, and project scaling, especially where investors view regulatory quality and contract enforcement as reliable (OECD, 2023).

This insight is particularly relevant for foreign investment in sectors characterized by long planning horizons and high upfront costs, such as renewable energy. Unlike short-term or easily reversible investments, renewable energy projects require stable conditions over extended periods to recover initial capital expenditures, which makes them sensitive to policy and regulatory risk (Polzin et al., 2015). The institutional environment therefore shapes not only the initial decision to invest but also the likelihood that announced projects are completed, expanded, and integrated into the host country's energy system (Rafiq et al., 2024). For this reason, institutional quality is increasingly treated as a central explanatory variable for cross country differences in investment effectiveness, even when headline investment volumes appear similar (Chen and Jiang, 2023).

International organizations have reached the same conclusion from a policy standpoint. The OECD (2023) argues that improving institutional and regulatory frameworks is essential for raising the quality of FDI and increasing its contribution to sustainable development, especially in emerging and middle-income economies. Jaumotte et al. (2024) make the same point for green FDI in sectors such as renewable energy: it depends on credible and

transparent policy regimes. Rather than focusing on attracting capital alone, policymakers are now encouraged to strengthen the governance conditions that allow foreign investment to generate durable economic and technological benefits.

The literature reviewed here provides the analytical foundation for an institutional political economy approach to FDI. Rather than treat foreign investment as an exogenous driver of development, this approach views outcomes as conditional on the quality and credibility of host country institutions (Bruno et al., 2018). For instance, spillover mechanisms (technology transfer, labor mobility, and supply chain linkages) depend on absorptive capacity and institutional conditions (Crespo and Fontoura, 2007). This framework explains why Spanish renewable energy investment can produce very different capacity outcomes in Chile and Mexico, despite similarities in resource endowments and investor characteristics. The dissertation therefore treats institutional quality as a conditioning variable that shapes how foreign capital is allocated, managed, and transformed into productive outcomes.

2.2.2 Renewable Energy Investment as a Distinct Form of Foreign Direct Investment

Renewable energy investment differs from other forms of FDI in several important ways. It is often grouped with infrastructure or capital-intensive investment, but renewable energy has structural features that set it apart from sectors usually examined in the FDI literature. Three features matter most: risk exposure, policy dependence, and technological dynamics (Lund, 2007). These features shape both investor behavior and the conditions under which foreign capital turns into sustained outcomes (OECD, 2023).

Renewable energy projects require significant upfront capital and generate returns over long periods. Utility-scale solar and wind projects, for example, involve large initial expenditures, covering generation equipment, grid connection, and land development. Yet, revenues accumulate gradually over timelines that often exceed twenty years (IRENA, 2024). Once constructed, these assets are effectively fixed in place and cannot be easily relocated. Therefore, investment decisions depend on two dimensions at once: near term market conditions, and long-term expected durability of policy frameworks and pricing mechanisms. This is the opposite of more mobile forms of FDI, where capital and production can be moved in response to adverse conditions (Dunning, 2015).

Another defining feature of renewable investment is its reliance on policy mediated revenues. Three policy levers are decisive for project viability and financing conditions: long-term power purchase agreements, competitive auctions, and dispatch rules (Criscuolo

and Menon, 2015). Empirical analysis shows that the same policy instruments produce very different deployment outcomes depending on institutional credibility and policy design (Bölük and Kaplan, 2022). Hence, policy credibility becomes part of the investment decision itself. Sudden changes in market design, pricing, or administrative procedures can rewrite project economics even after capital has been committed, which raises perceived risk and pushes up financing costs (OECD, 2023).

The clean energy economics literature increasingly reflects this. Empirical studies of renewable deployment consistently find that governance and institutional variables matter alongside economic fundamentals such as income levels and energy demand (Halldén et al., 2025). Rafiq et al. (2024) analyze OECD economies and show that institutional quality significantly influences renewable consumption and promotion, even after controlling macroeconomic conditions. Renewable expansion is not driven by cost reductions or technological progress alone. It also depends on governance conditions that shape investor confidence and risk perceptions. Cohen and Levinthal (1994) make a complementary point: organizations with prior preparation, in this case through institutional quality and regulatory experience, are better placed to capture benefits from external knowledge and capital inflows.

Halldén et al. (2025) show that institutional quality affects the effectiveness of public renewable investment programs. Stronger governance is associated with higher deployment efficiency and better alignment between public and private capital. Their analysis focuses on public investment, but the implications extend to private and foreign investors. Public policy frameworks, support schemes, and planning processes often underpin or crowd in private renewable deployment (Polzin et al., 2015). Empirical work on FDI induced technology spillovers shows that benefits accrue gradually through productivity growth, not immediately, which underlines the importance of sustained institutional support (Liu, 2008). Together these studies confirm that renewable investment outcomes are tied closely to the institutional environments in which projects are developed and operated.

Another dimension concerns risk and financing conditions. Renewable projects rely heavily on external financing, which makes them especially exposed to shifts in perceived regulatory and political risk (Hatton et al., 2025). Uncertainty over contract enforcement or administrative approval can raise the cost of capital, undermining project viability, and limiting the scale of investment (Wang and Chang, 2023). The OECD (2023) argues that reducing regulatory and political risk is essential to closing the global clean energy investment gap, especially in emerging and middle-income economies, where investment

needs are large and public resources are tight. Renewable FDI is therefore shaped by two things: expected returns, and the stability and credibility of the institutional context governing those returns (Jaumotte et al., 2024).

Renewable investment cannot be explained by resource availability or technology costs alone. Solar and wind costs have fallen sharply and performance has improved, which expands the range of viable investment locations (Jordan et al., 2012). Yet cross-country differences in renewable deployment remain substantial. The persistence of these gaps indicates that non technological factors play a decisive role. Huihui et al. (2024) show that even in advanced economies, institutional and economic progress jointly influence renewable development, which suggests that similar mechanisms operate in emerging regions such as Latin America. For foreign investors, these mechanisms translate into different assessments of market attractiveness, risk exposure, and long-term commitment across countries with comparable natural resources but distinct institutional profiles (Maloney, 2024).

For this dissertation, treating renewable investment as a distinct form of FDI has two implications. First, it reinforces institutional quality as an explanatory variable for investment outcomes. Additionally, it suggests that differences in renewable capacity growth across countries reflect not just differences in investment volumes, but differences in the ability of institutional frameworks to support project execution, scaling, and long-term operation. This perspective bridges the general FDI literature and the empirical analysis of Spanish renewable investment in Chile and Mexico, where institutional conditions diverge despite comparable resource endowments.

The studies analyzed in this section support a single argument. Renewable energy FDI is uniquely exposed to institutional conditions because of three structural features: capital intensity, long horizons, and policy mediated revenue structures (Lund, 2007). These features make renewable energy a particularly suitable sector for examining how institutional quality conditions the effectiveness of foreign investment. The insight underpins the comparative analysis in the chapters that follow, where differences in renewable capacity outcomes are read through the lens of institutional variation between Chile and Mexico, two major recipients of Spanish renewable investment with contrasting policy trajectories (OECD, 2023).

2.2.3 Foreign Direct Investment and Energy Transitions

A growing body of literature examines the relationship between FDI and energy or environmental transitions. This work questions the assumption that foreign capital uniformly supports the shift toward cleaner energy systems (Doytch and Narayan, 2016; Shahbaz et al., 2022; Apergis et al., 2023; Fang et al., 2024). Rather than treating FDI as a homogeneous force, recent research emphasizes three things: the sectoral composition of investment, its technological orientation, and the contextual conditions under which capital is deployed (Shahbaz et al., 2022). The central implication is that foreign investment can facilitate or hinder energy transitions, depending on where and how capital is deployed (Fang et al., 2024).

Early empirical contributions show that foreign investment effects vary widely across sectors. Doytch and Narayan (2016) analyze sectoral FDI flows and find a sharp split. Investment directed toward manufacturing and technology intensive activities is associated with higher renewable energy use. FDI concentrated in extractive or energy intensive industries can reinforce fossil fuel dependence. The distinction matters: aggregate FDI numbers obscure these effects. Investment oriented toward renewable technologies is a qualitatively different category from foreign investment in conventional energy or resource extraction, with distinct developmental and environmental consequences (Naseem et al., 2021).

More recent work links FDI directly to structural change within national energy systems. Fang et al. (2024) show that foreign investment can contribute to a gradual reconfiguration of energy mixes through industrial upgrading and technology transfer, especially when capital is directed toward renewable technologies. FDI can play a catalytic role in accelerating energy transitions, but only under conditions that allow clean technologies to be absorbed, scaled, and operated over time. FDI outcomes are not automatic. They depend on the environment in which investment takes place.

Other studies refine this perspective by examining specific mechanisms, including industrial transfer and technology spillover effects (Fang et al., 2024). Recent research warns that these effects can hinder rather than support renewable transitions under weak governance conditions. The net impact depends on the relative strength of these effects, a balance shaped by structural conditions and policy frameworks (Apergis et al., 2023). The dynamics matter most in developing and emerging economies, where energy transitions intersect with longstanding development challenges. Naseem et al. (2021) focus on Latin

American and Caribbean countries and find that FDI and renewable energy jointly contribute to environmental improvement, but only when embedded within broader sustainability-oriented development strategies. The positive effects are uneven across countries and reflect differences in structural characteristics and policy environments (OECD, 2023).

Despite these contributions, cross country empirical studies often obscure firm level behavior and country specific dynamics that shape energy transitions. Few contributions isolate a single home country investor operating across multiple host countries, which limits the capacity to identify the role of contextual factors in shaping investment outcomes (Rao et al., 2024). As a result, the mechanisms linking FDI to renewable deployment remain underexplored in comparative, investor centered analyses.

For this dissertation, this literature provides two main insights. First, FDI can play a meaningful role in supporting renewable deployment, but its effects depend on sectoral orientation and contextual conditions (Doytch and Narayan, 2016). Second, comparative research rarely asks how the same investors contribute differently to energy transitions across countries. By focusing on Spanish renewable energy firms operating in both Chile and Mexico, this study addresses that gap and offers a more granular view of how foreign investment interacts with national energy transitions.

2.2.4 Investment and Renewable Energy in Latin America: Stylized Facts and Cross-Country Divergence

Latin America occupies a prominent position in the global renewable energy landscape. The region combines abundant natural resources with a growing role in international clean energy investment. For instance, renewable sources account for more than 60% of total electricity generation, nearly twice the global average (IRENA, 2024). The profile reflects the historical dominance of hydropower, but it also captures a notable acceleration in solar photovoltaic (PV) and wind deployment over the past decade (IEA, 2023).

IRENA (2024) data illustrate the scale of this transformation. Between 2015 and 2023, installed solar capacity rose from roughly 5 GW to over 60 GW across the region; and, wind capacity more than doubled over the same period. This expansion was supported by three factors: cheaper technology, easier access to project finance, and broader participation by international developers and investors (Hatton et al., 2025). In this sense, FDI has played a central role. ECLAC (2024) reports that renewable energy is now one of the leading components of infrastructure-related FDI in Latin America. Most of the capital is concentrated in large scale solar and wind projects, with rising interest in newer segments

such as energy storage and green hydrogen (Jaumotte et al., 2024). Regarding origin, the flows are predominantly external in origin. European and North American firms feature most prominently among the developers, utilities, and infrastructure funds active in the region (OECD, 2023).

Nonetheless, observing aggregate trends can cover divergences between countries. For instance, Chile, Brazil, and Uruguay lead the region consistently. They attract high levels of foreign investment and have posted rapid capacity growth in both solar and wind (ECLAC, 2024). Chile illustrates the depth of the transformation. Non-conventional renewable energy (wind, solar, and biofuels) accounted for 59% of total electricity generation in 2024. Solar PV capacity reached roughly 7.3 GW and wind 4.7 GW by October of that year (CNE, 2024). In this context, the contrast in electricity mix is striking. Chile and Brazil far surpass Mexico, with renewables at 63.2% in Chile and 86.9% in Brazil, compared with 28% in Mexico (Mexico Business News, 2024). The situation in Mexico differs significantly. Its total renewable installed capacity grew from 17.4 GW in 2015 to 34 GW in 2024, and solar PV capacity rose by roughly 4,000% over the same period. Even so, the country has not matched Chile’s transformation of the electricity mix. Natural gas still supplies more than half of domestic generation, and more than half of that gas is imported from the United States (IRENA, 2024). For its part, Argentina has comparable resource endowments but has progressed only intermittently, constrained by macroeconomic instability (SENER, 2023).

These differences are reflected in the geographic distribution of renewable energy FDI. Chile and Brazil alone account for a substantial share of regional renewable investment announcements, while inflows to other markets remain comparatively modest (ECLAC, 2024). Table 2 outlines key characteristics of six major Latin American renewable energy markets, emphasizing their differing capacity outcomes, foreign participation, and policy environments.

Country	Renewable share of electricity	Solar PV capacity 2015 → 2023	Wind capacity trend 2015–2023	Key foreign actors in renewables	Policy regime stability
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	generation (latest)				
Brazil	≈86.9% (incl. hydropower)	Rapid expansion; among regional leaders	Strong sustained growth	Iberdrola, EDP, Enel, Engie, State Grid	Relatively stable auction framework
Chile	≈63.2% (non-conventional renewables 59% in 2024)	Major growth; ≈7.3 GW solar PV by 2024	≈4.7 GW wind by 2024	Iberdrola, Acciona Energía, Endesa Enel, EDF, Enel Green Power	Stable and predictable; consistent auctions
Mexico	≈28%	≈4,000% increase in solar PV; total RE capacity 17.4 GW (2015) → 34 GW (2024)	Moderate growth, slowed after 2018	Iberdrola, Acciona Energía, Enel Green Power, Naturgy	Volatile; ad hoc regulatory changes since 2018
Colombia	Moderate; rising solar and wind	Accelerating from a low base	Emerging projects in La Guajira	Enel, EDP, AES, Celsia	Generally stable; reform-driven expansion
Argentina	Modest	Intermittent expansion (RenovAr auctions)	Concentrated in Patagonia	Genneia, Pampa Energía, foreign IPPs	Constrained by macroeconomic instability
Uruguay	Very high (≈98% renewable electricity)	Mature wind and solar fleet	Wind dominant; among the highest per-capita penetration globally	Acciona, Enel, RWE, EDF	Stable; long-standing PPA framework

Table 2. Renewable energy and foreign investment across major Latin American markets, 2015 to 2023 (developed by the author)

Note. Author's elaboration based on IRENA (2024), ECLAC (2024), IEA (2023), CNE (2024), and Mexico Business News (2024). Renewable share refers to non-conventional renewable sources within total electricity generation; capacity figures refer to installed solar PV and wind.

The contrast between Chile and Mexico is especially instructive. Both countries have attracted the same Spanish multinational firms (Iberdrola, Acciona Energía, and Endesa Enel) and both have exceptional renewable resource endowments. Yet their trajectories diverge sharply in investment stability, regulatory coherence, and renewable penetration. The gap does not trace back to resources. It traces back to differences in institutional frameworks and regulatory trajectories. Chile has maintained relatively stable and predictable policy frameworks. Mexico has experienced significant regulatory volatility and ad hoc modifications since 2018 that have deterred private and foreign investment in the sector (Natorski and Solorio, 2023).

From a regional perspective, these stylized facts highlight the dual nature of Latin America's renewable landscape. On one side, the region offers some of the world's most attractive conditions for renewable generation, including high quality solar and wind resources and expanding electricity demand (Furey, 2025). On the other, the translation of that potential into realized capacity and sustained foreign investment varies sharply across countries. The gap reflects differences in institutional quality, policy stability, and grid readiness (Maloney, 2024). Latin America cannot be treated as a uniform renewable market. It is a heterogeneous set of national contexts with distinct institutional and investment trajectories (Jaumotte et al., 2024). For this dissertation, that heterogeneity is the analytical anchor. The contrast between Chile and Mexico provides a natural comparative setting in which to examine how institutional environments shape the effectiveness of Spanish renewable energy investment.

2.2.5 Spanish Foreign Direct Investment and Renewable Energy Firms in Latin America

Spain has become a key player in Latin America's foreign investment landscape, particularly in strategic sectors such as energy and infrastructure. Since the late 1990s, Spanish firms have maintained a sustained presence in the region. Three factors support this presence: historical, linguistic, and corporate linkages that have eased market entry and long-term engagement (Martínez and Jareño, 2014). Spanish FDI is therefore a structural component of Latin America's economic relationship with Europe, not a transitory or opportunistic flow. Álvarez et al. (2025) report that Spain is one of the largest European

investors in the region, and Latin America is in turn Spain's most important destination for outward FDI outside the European Union.

Within this broader relationship, the energy sector, and renewable energy in particular, has taken on growing prominence. Spanish multinational energy firms have expanded their international portfolios in response to two pressures: saturation of the domestic market, and the acceleration of global decarbonization. A growing share of outward investment has shifted toward low carbon infrastructure and renewable generation assets (Álvarez et al., 2025). The strategic reorientation has positioned Latin America as a core destination for Spanish renewable investment. The region offers abundant solar and wind resources, expanding electricity demand, and a long-standing openness to foreign participation in electricity markets (IRENA, 2024). Spanish firms are therefore major developers, owners, and operators of renewable assets across multiple Latin American countries, and they contribute materially to the region's solar and wind capacity expansion (OECD, 2023). Álvarez et al. (2023) examine innovation collaboration between foreign firms and local organizations in Latin America and find that institutional factors and national systems of innovation, not firm characteristics alone, determine the intensity and effectiveness of foreign firm engagement with host economies.

The academic literature on Spanish FDI in Latin America highlights both the scale and persistence of this relationship. Martínez and Jareño (2014) document long-standing patterns of Spanish investment in Brazil, Argentina, and Mexico, and identify large multinational enterprises in energy, telecommunications, and finance as the dominant channel. Two of their findings carry directly into the present analysis. First, they show that Spanish FDI in Latin America is heavily concentrated in a small set of large multinationals operating across multiple host countries simultaneously, which makes those firms effectively a single investor population exposed to different national institutional environments. That is the very condition that licenses a quasi-controlled comparative design. Second, they argue that the persistence of Spanish FDI in the region cannot be reduced to firm-level strategy or sectoral opportunity alone; host-country conditions, including macroeconomic stability and the predictability of the regulatory environment, shape both the volume and the composition of the investment that arrives. Their firm-level, multi-country approach, rather than treating Spanish FDI as a single aggregate regional flow, directly motivates the comparative, investor-centered design used in this dissertation. Institutional evidence confirms that the same pattern continues into the energy transition era, with a growing share of Spanish

outward investment directed toward energy infrastructure and sustainability related activities (ECLAC, 2024).

The strategic engagement plays out at the firm level. Four Spanish multinationals anchor the renewable portfolio in the region: Iberdrola, Acciona Energía, Naturgy, and Endesa Enel. They operate in multiple national markets at the same time, typically as lead developers or long-term asset owners rather than short term financial investors (Álvarez et al., 2025). Acciona's 2023 annual report illustrates the point. It identifies Latin America, and Chile in particular, as a core platform for renewable growth, reports more than 13.5 GW of installed capacity worldwide, and names renewable expansion as a key driver of revenues and earnings in 2023 (Acciona, 2023).

What is missing is a systematic examination of how Spanish renewable firms perform across different national contexts within the same region, and how variation in host country conditions shapes investment effectiveness and project outcomes. The literature rarely compares the experience of Spanish firms in countries with contrasting renewable deployment trajectories, even though institutional quality, regulatory stability, and policy credibility vary widely across Latin American markets (ECLAC, 2024). Chile and Mexico make the case directly. Both countries attract significant Spanish investment and have strong renewable resource endowments. Yet they show very different levels of policy stability, regulatory coherence, and renewable capacity growth (CNE, 2024; SENER, 2023).

For this dissertation, Spanish renewable firms are therefore treated not just as investment actors but as a quasi-controlled group through which broader structural dynamics can be observed. Their cross-country presence enables an investor centered comparison that complements the macro level analysis of renewable capacity growth and FDI flows. By examining how Spanish firms allocate capital, develop projects, and scale renewable assets in Chile and Mexico, the study deepens understanding of how foreign investment interacts with national institutional environments in shaping renewable energy transitions in Latin America (OECD, 2023).

2.2.6 Overview and Research Gap

The studies reviewed in this chapter provide a theoretical and empirical foundation for analyzing FDI in renewable energy. They also reveal a set of unresolved questions that motivate the focus of this dissertation. Across the different strands of research, one conclusion is consistent: FDI does not generate uniform outcomes across countries or sectors. Its effects depend on the environment in which capital is deployed, and on the

institutional arrangements that shape how investment is governed, absorbed, and turned into long term productive assets (Chen and Jiang, 2023).

Moreover, the renewable energy literature shows that clean energy investment is a distinct and particularly institution sensitive form of FDI. Three structural features explain this exposure: capital intensity, long horizons, and policy mediated revenues. Together they leave renewable projects highly exposed to regulatory uncertainty and political risk (Polzin et al., 2015). This point reinforces the analytical relevance of institutional quality for renewable deployment driven by foreign capital, particularly in emerging and middle-income economies with evolving regulatory frameworks.

Additionally, the literature on FDI and energy transitions shows that foreign investment can support renewable development and structural change, but its effects are heterogeneous and context dependent (Doytch and Narayan, 2016). Much of this work relies on broad cross-country analyses that obscure firm level behavior and country specific dynamics. Few studies examine how the same investors operate across multiple national contexts, which limits the ability to isolate the role of host country institutions in shaping investment outcomes (Rao et al., 2024).

Finally, institutional and policy reports document Latin America's growing role in global renewable investment and the prominence of Spanish firms in the region, but existing research is largely descriptive. Few academic studies systematically link Spanish renewable investment to differences in national institutional environments. Fewer still compare outcomes across countries such as Chile and Mexico, which share strong renewable resource endowments and a long history of foreign investor participation but display sharply divergent renewable deployment trajectories (IEA, 2023).

This dissertation addresses these gaps in two ways. First, it combines insights from the FDI, institutional, and renewable energy literatures, situated within the theoretical frameworks of the OLI paradigm, institutional economics, liberal institutionalism, and structuralism. Second, it applies a focused comparative analysis of Spanish renewable investment in Chile and Mexico. Investor characteristics are held broadly constant, which allows the analysis to isolate how institutional environments shape investment effectiveness and renewable capacity outcomes. The result is a more nuanced understanding of how foreign investment interacts with national contexts to drive or constrain energy transitions in Latin America (Álvarez et al., 2025; Fang et al., 2024). This synthesis provides the conceptual bridge to the empirical analysis developed in the chapters that follow.

Chapter Three

3. Methodology

Chapter 2 identified institutional quality and regulatory stability as the primary conditioning variables through which renewable energy FDI produces different outcomes across host countries (2.1). This chapter translates that framework into a quantitative comparative research design that can be examined empirically.

3.1 Research Design

This dissertation uses a quantitative comparative research design. The aim is to examine why Chile and Mexico, two Latin American economies with comparable renewable resource endowments, similar exposure to the same Spanish multinational energy firms, and similar macroeconomic trajectories, produced very different renewable capacity growth outcomes between 2015 and 2023. The study develops a regression-based framework to assess whether differences in institutional quality (regulatory quality (RQ), government effectiveness (GE), and rule of law (RL) from the World Bank Worldwide Governance Indicators (WGI)) are systematically associated with these divergent deployment outcomes.

The methodological logic follows a most similar systems design (Przeworski and Teune, 1970; Gerring, 2007); 3.2 develops the case-selection rationale in full. The research is empirical and explanatory in orientation. The study period runs from 2015 to 2023. This window captures the most dynamic phase of global renewable expansion and includes Mexico's critical regulatory shift from 2018 onward (see 2.2.4 and 3.2). The analytical focus is on solar photovoltaic and wind, the two technologies most deployed by the Spanish firms analyzed in this dissertation.

3.2 Case Selection

Chile and Mexico satisfy the most similar systems logic across four dimensions. First, both are large, economically diversified Latin American economies. Chile's GDP stood at roughly USD 344 billion in 2023 and Mexico's at USD 1.32 trillion. Both maintain interconnected national grids capable of absorbing utility scale renewable generation (ECLAC, 2024). Second, both have exceptional renewable resource endowments. Chile's Atacama Desert records irradiation levels above 2,000 kWh/m²/year, among the highest in the world. Mexico's northern states and the Isthmus of Tehuantepec combine strong solar resources with wind power densities above 670 W/m² at 100m height, among the highest in

Latin America (IEA, 2023; CNE, 2024; SENER, 2023). Moreover, both markets attract the same Spanish multinational firms (see 2.2.5), which collectively hold an estimated 30 to 40% of privately owned renewable capacity in each country (Álvarez et al., 2025; Acciona, 2023). The overlapping investor identity gives the comparison a quasi-controlled group: firm level ownership advantages, financial structures, and technology choices stay broadly constant, while host country institutional conditions vary.

Finally, and most important, the two countries have produced very different deployment outcomes despite these structural similarities. Chile expanded non-conventional renewable capacity from roughly 4 GW in 2015 to nearly 22 GW by 2023, with renewables reaching 63% of electricity generation (CNE, 2024; IRENA, 2024). Mexico grew total renewable capacity from 17.4 GW to 33 GW over the same period, yet renewables still accounted for only 28% of its electricity mix by 2023, with natural gas dominating (IRENA, 2024; SENER, 2023). The gap traces directly back to institutional and regulatory factors, with Chile maintaining a stable auction-based framework throughout while Mexico's post-2018 regulatory discontinuity reshaped the investment environment (Natorski and Solorio, 2023; see 2.2.4 for the three-mechanism account). Figure 2 below positions both countries within Latin America.



Figure 2. Case Selection: Chile and Mexico in Latin America. Shared Characteristics and Divergent Renewable Energy Outcomes, 2016–2023. Elaborated by the author based on data from IRENA (2025), World Bank WGI (2024), and ECLAC (2024).

3.3 Data Collection

The empirical analysis draws on two primary data sources. Renewable capacity statistics come from IRENA through IRENASTAT and IRENA Energy Profiles (IRENA, 2024;

2025), focusing on total installed solar photovoltaic and wind capacity. The dependent variable is the annual log change in installed gigawatts. For 2015 to 2016, where direct chart data were unavailable, capacity figures are back extrapolated at a conservative 5% compound annual growth rate from the 2017 observed value, consistent with IRENA regional trends. This back extrapolation affects only the descriptive trend figure, not the regression sample.

Institutional quality indicators come from the World Bank Worldwide Governance Indicators (WGI) dataset (Kaufmann et al., 2011). Three dimensions enter the analysis individually across all model specifications. Regulatory quality (RQ) measures the ability of governments to formulate and implement policies that promote private sector development. Government effectiveness (GE) captures public service quality, civil service competence, and policy implementation credibility. Rule of law (RL) reflects confidence in legal institutions and contract enforceability. Using individual components rather than a composite index allows the analysis to identify which governance channel matters most, a distinction with direct policy implications (Chen and Jiang, 2023; Rafiq et al., 2024). A control variable for energy demand growth, total energy supply (TES) growth measured as the annual log difference of TES in terajoules, is included to isolate the governance effect from demand side dynamics (IRENA / IEA national energy balances, 2024). Table 3 below summarizes all variables.

3.3.1 Variable Summary

Below there is a summary of the key variables:

Variable	Role	Source	Measurement	Expected Direction
RE Capacity Growth	Dependent	IRENA (2024)	Annual log diff of total installed solar and wind capacity (GW). Captures relative year on year change in deployed renewable infrastructure.	N/A
Regulatory Quality (RQ)	Key Explanatory	World Bank WGI (2024)	Ability of governments to formulate and implement sound policies for private sector development. Range approx. -2.5 to $+2.5$. (Expected positive a priori; note that the two-way FE specification can reverse this sign when year effects absorb global regulatory trends and pipeline-lag dynamics dominate within-country variation)	Positive
Gov. Effectiveness (GE)	Key Explanatory	World Bank WGI (2024)	Quality of public services, civil service competence, and policy implementation credibility. Critical for regulatory commitment durability.	Positive

Rule of Law (RL)	Key Explanatory	World Bank WGI (2024)	Confidence in legal institutions, contract enforceability, and property rights. Essential for long term PPA security.	Positive
TES Growth	Control	IRENA/IEA (2024)	Annual log diff of total energy supply (TJ). Proxies domestic energy demand growth.	Positive

Table 3. Variable Summary. RQ = Regulatory Quality; GE = Government Effectiveness; RL = Rule of Law; TES = Total Energy Supply. WGI scores in standard normal units. Capacity figures in gigawatts (GW).

3.4 Descriptive Statistics

Table 4 presents descriptive statistics for all variables across the sixteen country year observations, eight per country, covering 2016 to 2023. Although the study period is defined as 2015 to 2023, the dependent variable is constructed as the annual log difference of installed capacity, which consumes the 2015 observation as the base year; the regression sample therefore comprises eight annual log-difference observations per country. RE capacity growth averages 10.4% (log difference), with a standard deviation of 7.1 percentage points, which reflects meaningful variation in annual deployment rates. The minimum of -2.7% corresponds to Chile in 2023, when a major auction pipeline cycle reached completion. The maximum of 20.5% corresponds to Mexico in 2022, when several pre 2018 contracted projects came online at the same time. The three governance indicators show distinct distributional properties. Regulatory quality has the tightest spread (min: -0.25; max: +1.36; SD: 0.61). Rule of law spans the widest interval (min: -0.87; max: +0.98; SD: 0.82; variance: 0.67), which reflects the pronounced gap between Chile's consistently strong scores (0.63 to 0.98) and Mexico's persistently weak and deteriorating scores (-0.87 to -0.58). Government effectiveness sits between the two (SD: 0.51; variance: 0.26). TES growth is near zero on average (mean: 1.0%; SD: 2.0%), which indicates broadly stable energy demand in both economies over the study period.

3.5 Analytical Tools and Methods

3.5.1 Variable Structure

The variables operationalized in 3.3 (RE capacity growth as the dependent variable; RQ, GE, and RL entered individually as key explanatory variables; TES growth as control) enter the six model specifications below. The theoretical motivation for the disaggregated WGI approach, which is that contract security (RL) and administrative capacity (GE) carry greater explanatory weight than regulatory-quality indices for infrastructure investment (Chen and Jiang, 2023; Rafiq et al., 2024), also enables more precise policy implications: if RL is the binding constraint, the recommendation differs from one driven by GE or RQ.

Variable	N	Mean	SD	Min	Q1	Median	Q3	Max	Variance
RE Capacity Growth (log diff)	16	0.1036	0.0706	-0.0268	0.0488	0.0860	0.1754	0.2053	0.0050
Regulatory Quality (RQ)	16	0.5519	0.6089	-0.2514	0.0062	0.5624	1.0234	1.3639	0.3708
Government Effectiveness (GE)	16	0.2651	0.5130	-0.3435	-0.2732	0.2869	0.7405	0.9072	0.2632
Rule of Law (RL)	16	0.0844	0.8175	-0.8694	-0.6461	0.0226	0.9257	0.9815	0.6683
TES Growth (log diff)	16	0.0101	0.0197	-0.0350	0.0065	0.0148	0.0188	0.0422	0.0004

Table 4. Descriptive Statistics. Panel: Chile and Mexico, 2016–2023. N = 16 observations. WGI scores in standard normal units; RE growth and TES growth as log differences.

3.5.2 Statistical Models

Six model specifications are estimated in increasing order of demands. Model 1 is a pooled ordinary least squares (OLS) regression using a single WGI composite index (the simple mean of RQ, GE, and RL), providing an aggregate baseline association across the full pooled sample. Model 2 is a pooled OLS regression that disaggregates the WGI composite into its three individual components (RQ, GE, RL), revealing channel-specific effects that the composite obscures. Model 3 adds the TES growth control to the disaggregated specification, isolating the governance effect from demand-side dynamics. Models 1 to 3 take the general form:

$$RE\ Growth_{i,t} = \beta_0 + \beta_1 RQ_{i,t} + \beta_2 GE_{i,t} + \beta_3 RL_{i,t} [\pm \beta_4 TES\ Growth_{i,t}] + \varepsilon_{i,t} \quad (1)$$

where i indexes countries (Chile and Mexico) and t indexes years (2016 to 2023). Model 4 introduces country fixed effects (FE) using the within estimator, without the TES control. Country FE absorb time invariant country specific characteristics (grid legacy, market structure, and geographic conditions), so estimation focuses on within country temporal variation. Model 5 adds the TES control to the country FE specification. Model 6, the most demanding specification, adds year fixed effects alongside country FE (two-way FE) and the TES control. Year effects absorb common time shocks such as global commodity price changes, international capital flows, and renewable technology cost trends that may simultaneously affect deployment in both countries. The control matters most for the 2018 to 2021 period, when Mexico's regime change coincided with global renewable investment cycles:

$$RE\ Growth_{i,t} = \alpha_i + \lambda_t + \beta_1 RQ_{i,t} + \beta_2 GE_{i,t} + \beta_3 RL_{i,t} + \beta_4 TES\ Growth_{i,t} + \varepsilon_{i,t} \quad (2)$$

where α_i are country fixed effects and λ_t are year fixed effects. All six models are estimated with robust (HC3) standard errors. Fixed effects are preferred over random effects on theoretical grounds. With only two countries and $N = 16$, a formal Hausman test lacks power. The substantive concern is that country specific unobserved heterogeneity (grid legacy, market structure, geographic conditions) is plausibly correlated with the WGI regressors, which makes the random effects orthogonality assumption implausible regardless of test outcomes. Given the small sample of sixteen observations, all results are interpreted as indicative rather than definitive. This caveat applies with particular force to Model 6, the two-way fixed effects specification. Absorbing one country effect and seven year effects

from sixteen observations leaves only eight residual degrees of freedom before estimating four slope coefficients, which is at the lower bound of what panel inference can credibly support. Model 6 is therefore reported as a robustness check that tests whether the governance signal survives the most demanding controls available in this sample, not as the preferred specification. Models 4 and 5 (country fixed effects, without and with the TES control) are the primary basis for inference, and Model 6 results, particularly the large rule of law coefficient, should be read as suggestive rather than conclusive.

3.5.3 Software and Visualization

All statistical analysis and visualizations are conducted in Python 3. The analysis uses four libraries: pandas and NumPy for data management and transformation, statsmodels for OLS estimation with HC3 robust standard errors, linearmodels (PanelOLS) for fixed effects panel estimation with heteroskedasticity robust standard errors, and matplotlib for figure production. All figures are exported at 200 dpi. Figure 2 (case selection map) appears in this chapter. The remaining figures are reproduced in Chapter 4 alongside the empirical analysis they support.

3.6 Ethical Considerations

This research relies exclusively on publicly available secondary data from official international institutions, specifically the World Bank Worldwide Governance Indicators database and the IRENA IRENASTAT platform, and does not involve human participants, surveys, interviews, or confidential information. No significant ethical concerns arise from the data collection or research procedures.

Chapter Four

4. Empirical Analysis

Chapter 3 set out the methodological framework that tests the central argument of this dissertation: that institutional quality and regulatory stability condition the extent to which Spanish renewable energy FDI translates into deployed capacity in Chile and Mexico. This chapter applies that framework to the data. The analysis proceeds in three stages. First, it documents the renewable capacity growth trajectory of both countries between 2015 and 2023 (Section 4.1). Second, it compares the evolution of individual and composite institutional quality indicators across the two cases (Section 4.2). Third, it evaluates the empirical relationship between governance conditions and renewable capacity growth through descriptive visualization and formal regression analysis (Section 4.3). Section 4.4 situates the findings in the broader academic literature on institutions and renewable energy. The findings form the evidential basis for the conclusions and policy implications developed in Chapter 5.

4.1 Renewable Energy Capacity Growth: Chile and Mexico, 2015 to 2023

Figure 3 documents the evolution of total installed renewable energy capacity in Chile and Mexico over the study period. Both trajectories are derived from IRENA Energy Profiles data (IRENA, 2025), with 2015 and 2016 figures back, extrapolated at a 5% compound annual growth rate from the 2017 observed values. The two curves diverge sharply in both pace and structural character, reflecting fundamentally different deployment dynamics that align directly with the institutional account developed in Chapter 2.

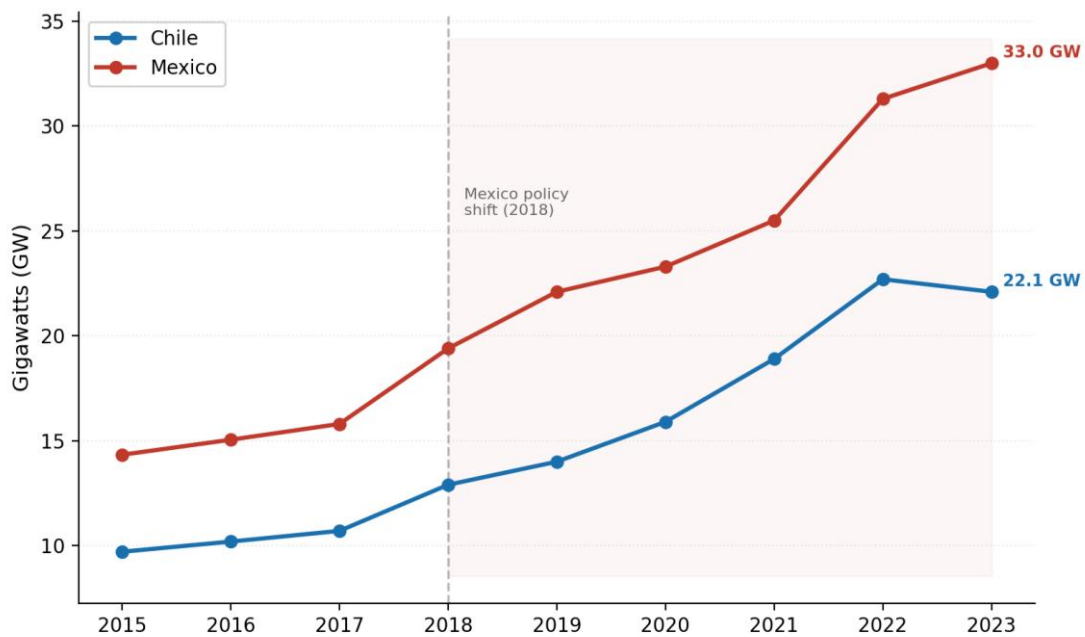


Figure 3. Renewable Electricity Installed Capacity (GW), Chile and Mexico, 2015–2023. Source: IRENA Energy Profiles (2025). 2015–2016 figures back, extrapolated at 5% CAGR. Dashed vertical line indicates Mexico’s 2018 regulatory shift.

Chile expanded total installed renewable capacity from roughly 9.7 GW in 2015 to 22.1 GW in 2023, a cumulative increase of 128%. Growth accelerated sharply from 2019 onward, with annual log difference growth rates of 12.7% in 2020, 17.3% in 2021, and 18.3% in 2022. The acceleration reflects the maturation of Chile’s competitive auction framework. By the late 2010s the framework had built a substantial pipeline of bankable solar and wind projects, which came online steadily in the early 2020s. The modest 2.7% contraction in 2023 reflects the completion of a major auction cycle and a temporary pause before the next procurement round, not a structural reversal.

Mexico starts from a considerably higher absolute base of roughly 17.4 GW in 2015 and expanded to 33 GW by 2023, a cumulative increase of about 90%. The growth was heavily uneven. The sharpest annual increases (20.5% in 2018 and 20.5% in 2022) correspond to the completion of project cohorts awarded under pre 2018 competitive auctions. After the 2018 regulatory changes (the suspension of new auction rounds, the modification of dispatch priority rules to favor state owned generation, and legally contested changes to power purchase agreement conditions) private and foreign developers cut new project commitments sharply. By 2023 Mexico’s annual growth rate had slowed to 5.3%, against Chile’s compound growth averaging 16% per annum over 2019 to 2022.

The critical distinction between the two countries is not the volume of capacity added, which is broadly comparable in percentage terms. It is the character of the growth process behind those additions. Chile's expansion rests on a steady flow of new investment commitments, enabled by stable regulatory conditions. Mexico's post 2018 growth increasingly reflects the completion of legacy contracts rather than active new investment. The trajectory is best read as the realization of a contracted pipeline rather than as evidence of a healthy ongoing investment environment. The distinction is fundamental to the institutional argument. Governance conditions operate through the investment pipeline, and their effects on operational capacity show up only with a lag of several years.

4.2 Institutional Quality: Governance Divergence, 2015 to 2023

Figure 4 presents the evolution of the three individual governance indicators for Chile and Mexico over the study period. The two countries begin from markedly different starting points and diverge further over time, tracing institutional trajectories that closely parallel the capacity dynamics documented in Section 4.1.

Chile kept consistently positive scores across all three governance dimensions throughout the study period. Regulatory quality remained the strongest indicator, ranging from 0.93 to 1.36 and declining only modestly toward 2023. Government effectiveness fell from 0.83 in 2016 to 0.55 in 2021, then partially recovered to 0.72 in 2023, in line with the administrative pressures of Chile's social upheaval and constitutional reform process. Rule of law declined from 0.96 in 2016 to 0.63 in 2023, the most pronounced erosion of the three indicators. Despite the downward trends, all three scores stayed substantially positive throughout, which indicates that regulatory frameworks continued to function with enough credibility to support private investment commitments.

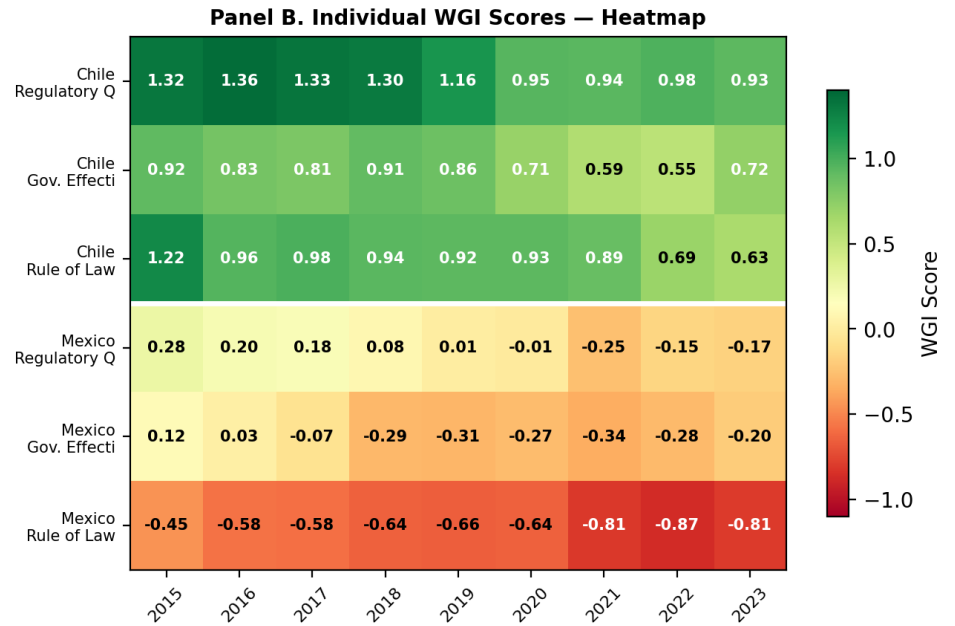
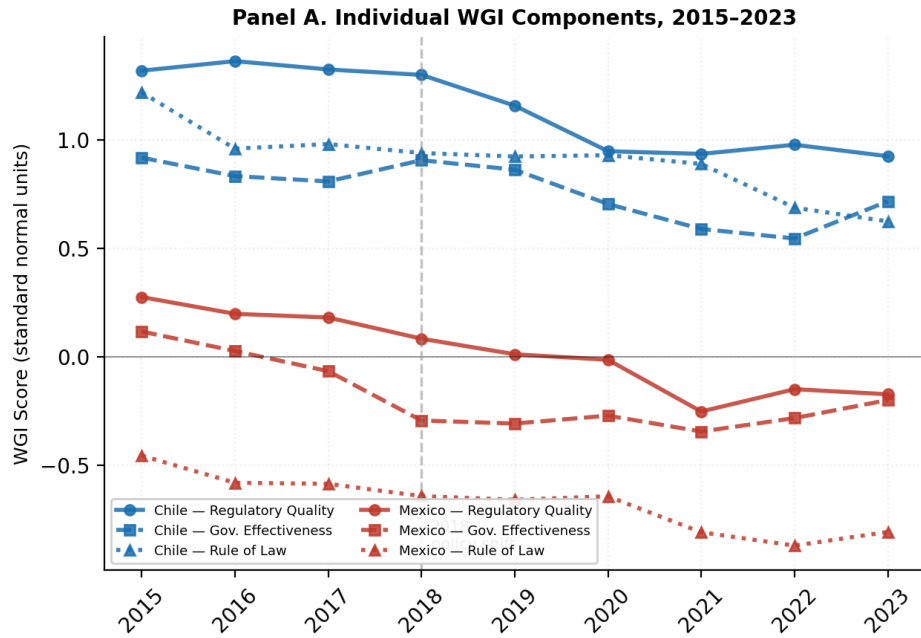


Figure 4. Individual WGI Components (RQ, GE, RL) and Heatmap, Chile and Mexico, 2015–2023. Panel A: Line chart of individual indicators. Panel B: WGI composite heatmap. Source: World Bank WGI (2024)

Mexico's trajectory is the opposite. All three indicators deteriorated sharply from 2018 onward. Regulatory quality fell from +0.18 in 2017 to -0.25 in 2021, a decline of 0.43 points, before partially recovering to -0.17 in 2023. Government effectiveness dropped from -0.07 in 2017 to -0.34 in 2021. The most severe deterioration was in rule of law, which fell from -0.58 in 2016 to -0.87 in 2022, a decline of 0.29 points concentrated in the years of the 2018 to 2021 legislative amendments. The declines correspond directly with the policy interventions documented by Natorski and Solorio (2023): the suspension of competitive auctions in 2018, the modification of the Electricity Industry Law in 2021, and contested changes to dispatch priority rules. The partial recovery after 2021 was not enough to restore investor confidence and leaves Mexico well below pre 2018 governance levels. The heatmap in Panel B shows the cross-country contrast at a glance. Chile's scores are uniformly green across all indicators and years; Mexico's are uniformly red and amber. The average gap in rule of law alone across the study period is roughly 1.6 WGI points.

4.3 Statistical Analysis: Governance and Renewable Capacity Growth

4.3.1 Descriptive Evidence

Figure 5 plots annual renewable energy capacity growth rates against each of the three individual governance indicators separately for each country year observation, with Chile in blue and Mexico in red. Year labels identify policy moments within each trajectory.

Across all three panels, the two country clusters separate cleanly along the governance axis. Chile occupies the positive range of each indicator. Mexico occupies the negative range. Within each cluster, however, growth rates vary widely in ways that are unrelated to contemporaneous governance scores. Chile's annual growth ranges from -2.7% in 2023 to 18.7% in 2018, driven by pipeline completion dynamics rather than year to year governance levels. Mexico's ranges from 4.9% in 2016 to 20.5% in 2018 and 2022, both years when pre contracted project cohorts came online at the same time. The pooled OLS fitted lines have near zero slopes across all three panels, which is expected: institutional effects operate at the level of multi year investment decisions, not annual capacity figures. Government effectiveness shows the steepest negative pooled slope, consistent with the OLS model results below. The significance of individual indicators emerges only once country and year heterogeneity is controlled for, as the regression models show.

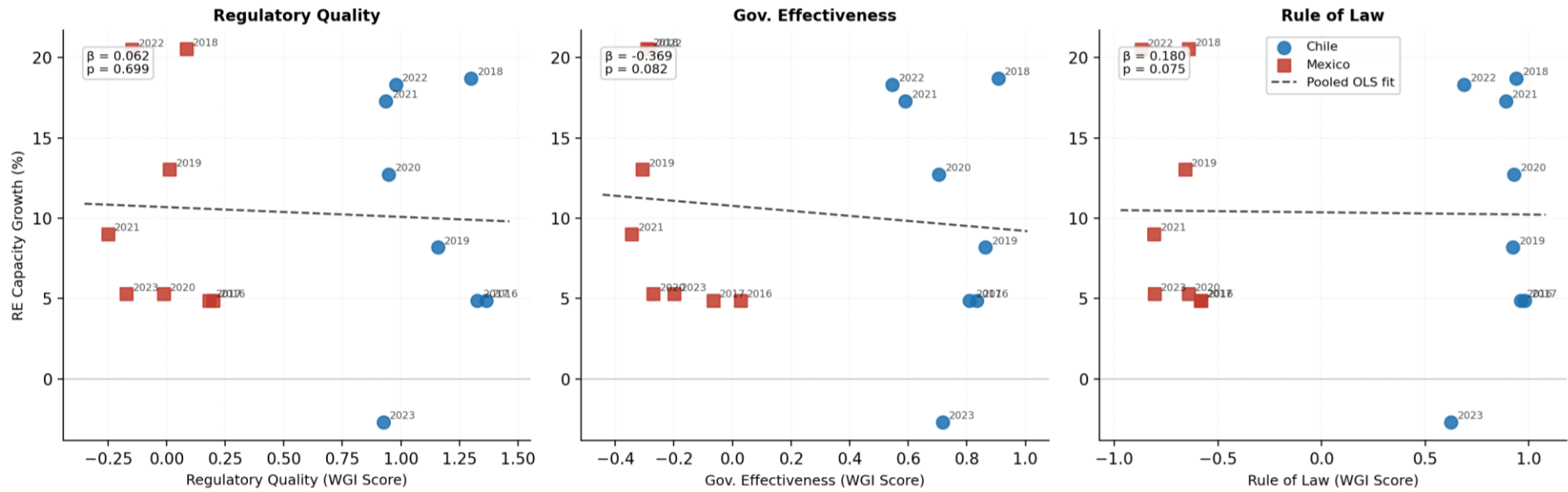


Figure 5. RE Capacity Growth vs. Individual WGI Indicators (RQ, GE, RL), 2016–2023. Each panel shows the pooled OLS fit (dashed line). Elaborated by the author based on data from: IRENA (2025); World Bank WGI (2024).

4.3.2 Regression Results

Table 5 presents results for all six model specifications, organized from simplest (pooled OLS with the WGI composite) to most demanding (two way FE with disaggregated indicators). All models use robust (HC3) standard errors, enabling direct assessment of how findings change as controls for country heterogeneity, time shocks, and indicator disaggregation are progressively added.

	OLS (1) WGI Composite	OLS (2) RQ+GE+R L	OLS (3) +TES	FE (4) Ctry	FE (5) Ctry+TE S	FE (6) 2, Way
WGI Composite	-0.006 (0.030)	—	—	—	—	—
Regulatory Quality (RQ)	—	0.062 (0.161)	0.056 (0.163)	0.101 (0.134)	0.094 (0.134)	-0.316** * (0.027)
Gov. Effectiveness (GE)	—	-0.369† (0.213)	-0.365 † (0.215)	-0.394* * (0.171)	-0.381** (0.172)	-0.070 (0.032)
Rule of Law (RL)	—	0.180† (0.101)	0.177† (0.103)	0.100 (0.264)	0.096 (0.265)	0.778*** (0.118)
TES Growth			0.121 (1.006)		0.265 (0.671)	-3.286** (0.848)
R ²	0.003	0.243	0.244	0.253	0.255	0.967
N	16	16	16	16	16	16
Country FE	No	No	No	Yes	Yes	Yes
Year FE	No	No	No	No	No	Yes

*Table 5. Regression Results: RE Capacity Growth and Individual Governance Indicators. Dependent variable: RE Capacity Growth (annual log difference). Robust (HC3) standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, † $p < 0.10$. FE (4) and (5): country within estimator. FE (6): two-way FE absorbing country and year effects.*

Hausman test supported FE over random effects. Panel: Chile and Mexico, 2016–2023. N = 16 observations.

Model 1 (pooled OLS with the WGI composite) produces a small, statistically insignificant coefficient on the composite index ($\beta = -0.006$, $p = 0.845$, $R^2 = 0.003$). On its face, this is a non-result. Read against the disaggregated specifications that follow, it is informative: the composite obscures offsetting channel-specific effects (a negative GE coefficient and a positive RL coefficient), which net out to near zero. The composite result therefore underscores why disaggregation is necessary and previews the channel-specific findings developed below. In Models 2 and 3 (pooled OLS, disaggregated), government effectiveness carries a marginally significant negative coefficient ($\beta = -0.37$, $p = 0.082$ in Model 2), while rule of law is marginally positive ($\beta = +0.18$, $p = 0.075$). Regulatory quality is not significant in either specification. Adding TES growth in Model 3 barely moves the WGI coefficients, which confirms that demand side dynamics do not meaningfully confound the governance estimates at this stage. In Models 4 and 5 (country FE), government effectiveness becomes conventionally significant ($\beta = -0.39$, $p = 0.042$ in Model 4), while RQ and RL remain insignificant. The within R^2 rises to 0.253, which indicates that within country year to year variation in GE accounts for roughly a quarter of within country variation in annual growth rates.

The most important results emerge in Model 6 (two-way FE). Rule of law carries a large, positive, and highly significant coefficient ($\beta = +0.778$, $p = 0.007$): a one unit improvement in RL is associated with a 77.8 %age point increase in annual RE capacity growth, controlling for country and year effects and energy demand. Regulatory quality is significantly negative ($\beta = -0.316$, $p = 0.001$), and TES growth is significantly negative ($\beta = -3.29$, $p = 0.030$). The within R^2 rises sharply to 0.967.

Figure 6 presents coefficient estimates with 95% confidence intervals for the three main disaggregated model variants (Models 3, 5, and 6).

The divergent signs on individual WGI components require careful interpretation. The positive and significant coefficient on rule of law in Model 6 is theoretically coherent. Robust contract enforcement and property rights are the precondition for bankable renewable projects, which rely on long term power purchase agreements spanning twenty or more years (Polzin et al., 2015). Chile's consistently high RL scores (0.63 to 0.98) supported the legal certainty that underpinned its auction pipeline. Mexico's RL deterioration from -0.58 to -0.87 directly eroded the enforceability conditions on which project finance depended. The negative coefficient on regulatory quality in Model 6 likely reflects a reversal of causality

artifact specific to the two way structure. With year effects absorbing global regulatory trends, within country RQ variation is dominated by Chile's post 2019 score erosion, which occurred at the same time as peak capacity additions from pre contracted projects. The negative and significant coefficient on TES growth in Model 6 ($\beta = -3.29$, $p = 0.030$) reflects the same pipeline dynamic. In countries where renewables are displacing fossil fueled generation rather than meeting net new demand, years of strong renewable capacity additions coincide with weak or contracting overall energy supply growth. The coefficient is therefore better read as a marker of the displacement driven character of the deployment cycle than as evidence that energy demand suppresses renewable investment. In the country FE models, where this artifact does not arise, government effectiveness is the binding governance constraint ($\beta = -0.38$, $p = 0.042$ in Model 5). The negative sign requires interpretation. On its face, a negative GE coefficient says that higher government effectiveness predicts lower annual capacity growth, which inverts the institutional thesis. The reconciling mechanism is the pipeline lag. Years of high GE produce investment commitments whose capacity comes online three to five years later, not in the same year. Within country, contemporaneous correlations between GE and annual deployment therefore pick up the timing offset rather than the underlying institutional effect: the high GE years feed the future pipeline, while the current year's deployment reflects decisions made when GE was lower. This is precisely the mechanism Polzin et al. (2015) theorize, and it is one of the reasons aggregate cross country studies relying on contemporaneous correlations tend to understate institutional effects. The pattern still supports the broader institutional argument: bureaucratic capacity and implementation credibility, rather than formal regulatory quality scores, is the channel through which governance shapes the renewable investment pipeline, but the effect operates on a multi year lag that the annual specification cannot fully resolve.

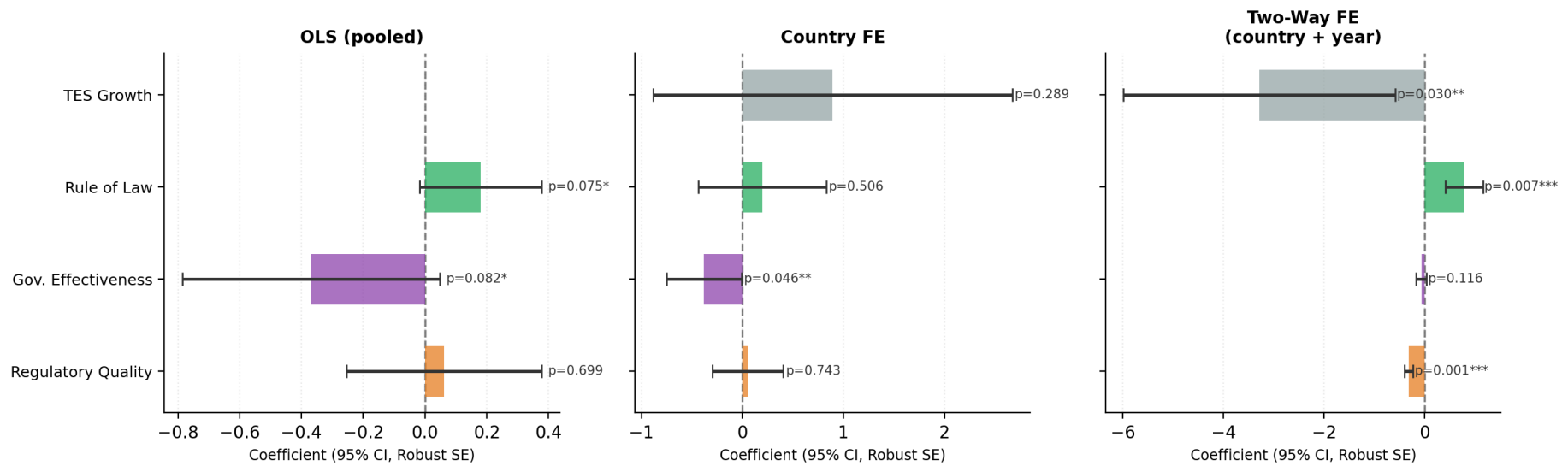


Figure 6. Coefficient Estimates — Individual WGI Indicators. Models: OLS (pooled), Country FE+TES, Two Way FE+TES. Robust standard errors. 95% CI shown. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Elaborated by the author based on data from: World Bank WGI (2024); IRENA (2025).

4.4 Discussion: Situating the Findings in the Literature

The combined evidence from Sections 4.1 to 4.3 is internally consistent with the institutional account and engages productively with the broader academic literature on governance and renewable energy FDI. Three lines of comparison stand out.

First, the finding that rule of law is the most consistently significant governance channel in the two-way FE specification reproduces at the bilateral country level the pattern Chen and Jiang (2023) identify in their cross-country analysis of 131 economies. The institutional FDI nexus for infrastructure investment is heterogeneous across governance dimensions, and contract security and legal certainty carry greater explanatory power than composite governance indices. Rafiq et al. (2024) make a similar point: contract enforceability and rule of law are the binding institutional constraints for renewable FDI in middle-income countries. The Chile Mexico findings reproduce this hierarchy in a tightly controlled bilateral comparison, which strengthens the external validity of the cross-country results.

Moreover, the significance of government effectiveness in the country FE specifications aligns with Halldén et al.'s (2025) finding that bureaucratic capacity and permitting efficiency are the operative administrative bottlenecks in turning investment commitments into operational capacity. Mexico's GE deterioration from -0.07 in 2017 to -0.34 in 2021 captures the administrative erosion documented by IEA (2023): delays in grid connection approvals, inconsistent environmental licensing, and contested permitting processes that raised project development costs and timelines for post 2018 investments. Chile's GE decline from 0.83 to 0.55 over the same period was real but smaller and stayed in positive territory, which preserved enough administrative capacity to maintain project execution timelines.

Additionally, the descriptive evidence speaks directly to Polzin et al.'s (2015) model of renewable energy finance, which identifies three bankability conditions as the primary institutional channels: enforceability of long-term power purchase agreements, predictability of dispatch rules, and administrative reliability of grid connection. Chile's sustained auction-based procurement system provided all three throughout the study period. Mexico's post 2018 interventions systematically dismantled each one. The empirical result is a causal mechanism operating at the level of investment pipeline formation. Mexico continued to add capacity from legacy contracts even as governance deteriorated, because the pipeline operates with a lag of three to five years between financial commitment and operational

capacity. This pipeline lag mechanism explains why contemporaneous governance scores do not correlate strongly with annual capacity additions in the pooled sample, and why the institutional story reads more clearly in comparative than in econometric terms.

The conclusion also connects to Dunning's (1980, 2015) OLI framework and North's (1990) institutional economics, which together underpin the theoretical framework in Chapter 2. From the OLI perspective, location advantages, particularly the credibility and predictability of the regulatory environment, shape both the initial attraction and the operational effectiveness of investment. The empirical evidence confirms that Chile's institutional environment was a sustained location advantage for renewable FDI. Mexico's deterioration after 2018 turned what had been a competitive location into a significantly less attractive one. North's distinction between formal rules and informal enforcement adds further nuance. Mexico's formal regulatory framework for renewable energy stayed largely intact on paper. But the credibility of enforcement, captured in the RL and GE scores, collapsed. That collapse is precisely what the regression results identify as the operative constraint.

Chapter Five

5. Conclusion, Recommendations, and Policy Implications

5.1 Summary of Principal Findings

This dissertation set out to examine whether differences in institutional quality, specifically regulatory quality (RQ), government effectiveness (GE), and rule of law (RL), can explain the divergence in renewable energy capacity growth between Chile and Mexico over the period 2015 to 2023. Drawing on IRENA capacity data and World Bank WGI governance indicators, and grounded in Dunning's (1980, 2015) OLI paradigm and North's (1990) institutional economics, three principal findings emerge from the analysis.

The first is that both Chile and Mexico added substantial renewable capacity over the study period, but at different rates (128% and 90% respectively). Also, it is worth mentioning that the composition and durability of those additions diverged even more sharply than the headline numbers suggest. Chile's growth from 9.7 GW to 22.1 GW reflected a self-renewing flow of new investment commitments supported by a stable and predictable auction-based framework, and by 2023 renewables accounted for 59% of its electricity generation. Mexico's expansion from 17.4 GW to 33.0 GW tells a very different story. Most of what came online after 2018 was the completion of projects already contracted before the regulatory shift. Once the López Obrador administration suspended competitive auctions, modified dispatch priority rules, and introduced legally contested changes to power purchase agreement conditions, the active investment pipeline contracted sharply, and renewables still only supplied 28% of the electricity mix by 2023.

The second finding concerns the governance gap between the two countries. The divide was large, sustained throughout the study period, and consistent with the divergent deployment outcomes across all three WGI dimensions. Chile maintained positive scores on RQ, GE, and RL throughout, even as all three declined gradually from around 2019 onward: RQ ranged from 0.93 to 1.36, GE from 0.55 to 0.91, and RL from 0.63 to 0.98. Mexico's scores moved in the opposite direction from 2018 onward, with rule of law taking the biggest hit, falling from -0.58 to -0.87 in direct correspondence with the interventions that most severely affected private and foreign renewable developers (Natorski and Solorio, 2023; IEA, 2023).

The third finding comes from the regression analysis, which produces a more nuanced picture. In the country-fixed effects models, government effectiveness was consistently the

most significant indicator ($\beta = -0.39$, $p = 0.042$ in Model 4). In this context, the result portrays administrative capacity and implementation credibility as the binding constraints on annual deployment. In the two-way fixed effects model, which also controls for common time shocks, rule of law became the dominant channel and is highly significant ($\beta = +0.778$, $p = 0.007$ in Model 6): a one-unit improvement in RL is associated with a 77.8 percentage point increase in annual RE capacity growth. It is worth noting though, that with only sixteen observations in total, these results need to be read as exploratory and indicative rather than definitive, but they are internally consistent and theoretically coherent.

5.2 Contribution to the Literature

This dissertation makes four contributions to the academic literature on institutions, FDI, and renewable energy transitions.

The first is methodological. By disaggregating the WGI into its individual components rather than relying on a composite index, the analysis is able to identify which specific governance channel matters most for renewable energy investment outcomes. The finding that rule of law and government effectiveness carry greater explanatory power than regulatory quality is consistent with what Chen and Jiang (2023) and Rafiq et al. (2024) find across much larger cross-country samples. Nonetheless, the comparative design adopted here strengthens the explanatory power of the institutional argument. Because the three main parameters (resource endowments, investor identity, and technology type) are held broadly constant across the comparison, the institutional explanation is harder to attribute to other structural differences.

The second contribution relates to the investment pipeline mechanism proposed by Polzin et al. (2015), which is difficult to test using large cross-country datasets. The comparison between Chile and Mexico suggests that institutions influence renewable energy investment by shaping the viability of long-term investment commitments rather than short-term deployment decisions. This finding has important implications for how researchers study the relationship between governance and investment. Studies that only compare governance indicators with annual renewable energy capacity additions may underestimate the impact of institutions, as there is often a delay of three to five years between an investment decision and the moment new capacity becomes operational. Hence, it would be useful in future research to use longer time periods to capture these effects.

Third, the dissertation adds to a growing body of work on renewable energy FDI in Latin America by quantifying the governance footprint of Mexico's 2018 to 2021 regulatory

discontinuity and linking it directly to the capacity trajectory. Natorski and Solorio (2023) and IEA (2023) document the policy changes in rich qualitative detail, but this study puts numbers on them, through the WGI indicators. Also, it shows that Mexico's rule of law deterioration was not only the largest governance decline across the study period, but also the most significant predictor of capacity growth in the most demanding model specification. This finding adds a layer of empirical precision to accounts that had so far remained largely descriptive.

The fourth contribution speaks to International Relations debates on how domestic institutions shape the effects of foreign capital. The findings from the Chile–Mexico comparison complicate several arguments that have influenced this literature.

One line of scholarship has emphasized investment treaties and external legal commitments as the primary constraints on host-country behavior. This may suggest that international institutional frameworks are what give foreign investors the confidence to commit (Keohane and Martin, 2003). However, Mexico's post-2018 experience does not entirely align with this view. Existing treaty frameworks remained in place, yet investment outcomes shifted substantially. Hence, pointing to domestic variables, particularly rule of law and government effectiveness, as the more consequential factors in sustaining long-term foreign investment.

A different challenge comes from structuralist and dependency traditions, which have tended to treat FDI in developing economies as inherently extractive or as a mechanism for reproducing external subordination (Cardoso and Faletto, 1979). The Chilean case does not confirm that expectation. Under conditions of institutional stability, Spanish renewable energy investment appears to have contributed to a genuine recomposition of the national energy system. Though, it is worth noting that this should be read as a context-specific finding rather than a broad argument against dependency reasoning.

What the comparison also shows is that the decisive variable in both cases is not geopolitical alignment, the power of the investor's home state, or the terms of international agreements, but the host country's capacity to implement and hold to long-term regulatory commitments. For IR scholars working on energy transition and climate governance, decarbonization outcomes seem to depend less on the architecture of international agreements than on the domestic institutions that determine whether foreign capital actually becomes infrastructure. Hence, in this context, institutional quality is not a background condition, but the mechanism through which international capital flows do or do not translate into real decarbonization at the country level.

5.3 Policy Implications

The findings of this study have distinct implications for Chile and Mexico, and broader relevance for Latin American economies looking to accelerate their renewable energy transitions through FDI.

For Mexico, the most urgent priority is restoring the legal security of renewable energy contracts. The rule of law indicator, the most significant governance channel in the two-way FE specification, captures exactly what investors care about: whether the long-term power purchase agreements will actually be honored. With an RL score of -0.81 in 2023, Mexico sits below both Chile's $+0.63$ and the regional Latin American average. For this reason, simply resuming competitive auctions is unlikely to be enough; especially if the enforceability of the resulting contracts remains in doubt. Investors will judge credibility not by what the government announces but by what it actually upholds, including the contracts that were contested between 2018 and 2021. At the same time, restoring legal security is not the only piece of the puzzle. The government effectiveness channel in the country FE models points to a separate, but equally important challenge: even when the legal framework is sound, permitting bottlenecks, delays in grid connection approvals, and inconsistent environmental licensing processes raise project development costs and make projects less bankable, particularly for smaller developers without the balance sheet to absorb lengthy timelines. Mexico's GE score of -0.20 in 2023 suggests there is significant room for improvement on this front.

For Chile, on the other hand, the message is more cautionary than corrective. The country continues to attract renewable investment and its governance scores remain positive, but the gradual erosion across all three indicators over the study period is worth taking seriously. Government effectiveness fell from 0.83 to 0.55 between 2016 and 2021, and rule of law from 0.96 to 0.63 between 2016 and 2023. The capacity additions that have been coming online since 2019 largely reflect investment decisions made when those scores were substantially higher, in the 2015 to 2018 window. If the erosion trend continues, its effects on the investment pipeline will only become visible in the capacity data from around 2026 onward, by which point the options for course correction are more limited. Maintaining the consistency of auction design, contract terms, and grid connection timelines is not a passive achievement, it requires active institutional stewardship.

At the regional level, the findings reinforce the case for evaluating governance conditioned renewable energy FDI frameworks against sector specific criteria rather than

broad governance indices. The RISE program and similar metrics would give Latin American governments a more actionable diagnostic tool than the WGI alone. In practice, diagnosing a legal enforceability issue calls for legislative reform and judicial credibility building, which is a very different reform agenda from diagnosing an administrative capacity problem, which calls for process streamlining and institutional capacity building. Getting the diagnosis right matters for the strategy, the timeline, and the kind of international support that is actually useful.

5.4 Limitations and Future Research Directions

This study has four main limitations, each of which points toward a direction for future research.

First and foremost, the small size of the sample taken for the study. Sixteen observations, eight per country over eight years, is not enough to support strong statistical inference. The regression results need to be read as exploratory evidence that is consistent with the institutional argument, not as proof of it. Expanding the comparison to include additional Latin American cases, Colombia, Brazil, Peru, and Argentina all offer interesting variation on both governance quality and deployment outcomes, and extending the time horizon back to around 2000 would substantially improve statistical precision and allow for more credible identification.

The second limitation is the inability to model the pipeline lag directly. Because the dataset measures only operational capacity and governance indicators in the same year, the regressions do not account for the typical three-to-five-year delay between investment decisions and the completion of renewable energy projects. Project level pipeline data, which are increasingly available through the Global Renewables Watch, IRENA project databases, and national energy ministries, would make it possible to match governance conditions at the time of investment decision to capacity outcomes at the time of commissioning. That would be a much more precise test of the mechanism this dissertation is trying to capture.

Third, the WGI indicators provide a broad measure of national governance quality and may not fully capture the sector-specific institutional factors that influence renewable energy investment. These include the design and credibility of auction systems, dispatch priority regulations, permitting processes, and the efficiency and consistency of grid connection procedures. The RISE program and similar energy sector governance metrics would provide proxies that are more directly aligned with what investors actually care about.

Fourth, the study does not examine behavior at the firm level. In this sense, the way in which Iberdrola, Acciona, Naturgy, and Endesa Enel specifically adjusted their investment strategies in response to Mexico's regulatory changes is not addressed in the dissertation. Future research could combine interviews with project-level data to complement the macro-level patterns identified in this dissertation. This would provide a more direct way of understanding how changes in governance influence investment decisions in practice.

5.5 Concluding Remarks

The renewable energy transition in Latin America is fundamentally an institutional challenge, not just a technological or financial one. This dissertation has shown, through a comparative analysis of Chile and Mexico between 2015 and 2023, that the quality of a country's governance environment, specifically its rule of law and government effectiveness, shapes the extent to which Spanish FDI in renewable energy actually translates into deployed capacity. The success case of Chile's institutional stability shows the creation of an efficiency cycle. That is: reliable regulatory frameworks made projects bankable, bankable projects attracted financing, and that financing delivered infrastructure at a pace that transformed the country's electricity mix. However, Mexico's governance deterioration after 2018 disrupted this cycle at the investment decision stage, so that even as capacity continued to be added from legacy contracts, the underlying pipeline sustaining additions into the following decade quietly collapsed.

Although the regression analysis cannot definitively prove this mechanism in a sample of sixteen observations, the findings show a consistent pattern. Government effectiveness is significant in the country fixed-effects models, while rule of law remains significant and substantial in the two-way fixed-effects models. In addition, changes in governance closely mirror changes in renewable energy capacity across both countries and throughout the study period. This pattern is theoretically plausible and aligns with previous research by Chen and Jiang (2023), Rafiq et al. (2024), and Polzin et al. (2015). However, unlike those studies, this dissertation examines a setting in which many of the factors that usually complicate cross-country comparisons have been deliberately controlled for.

Hence, the practical message is clear. For Mexico, credible legal commitments and effective public administration are not optional extras that can be addressed once the energy transition is underway. They are the preconditions for getting it underway at the required scale. For Chile, the institutional framework that made its transition possible is not self-

sustaining, and the gradual erosion visible in the data over the study period is a signal worth acting on before it shows up in the investment pipeline.

Finally, for the research community, the most important methodological lesson is that measuring the governance-investment relationship through aggregate indices and contemporaneous data can understate both the magnitude and the specificity of what matters. The energy transition will ultimately be won or lost not through policy announcements, but through the legal and administrative systems that determine whether capital becomes operational infrastructure.

6. Declaration Regarding the Use of ChatGPT or Other Generative AI Tools

I hereby declare that I, Karen Camacho Vilacoba, a student of the Double Degree in International Relations and Business Analytics at Universidad Pontificia Comillas, in submitting my Final Degree Project entitled “*Driving Green Growth: Spanish Foreign Direct Investment in Latin American Renewable Energy , A Comparative Study of Chile and Mexico*”, have used Generative Artificial Intelligence tools such as ChatGPT or similar AI, based tools exclusively within the context of the activities described below:

1. **Critical analysis:** To identify counterarguments to specific theses I intended to defend.
2. **References:** In combination with other tools (e.g., academic databases), to identify preliminary references, which were subsequently verified and validated independently.
3. **Methodological support:** To explore methods applicable to specific research problems.
4. **Code interpretation:** To assist with preliminary data analysis.
5. **Multidisciplinary insight:** To understand perspectives from different academic fields on multidisciplinary topics.
6. **Template construction:** To design structured formats for specific sections of the dissertation.
7. **Language and style revision:** To improve the linguistic quality and clarity of the text.
8. **Preliminary content and diagram generation:** To sketch initial diagrams and conceptual structures.

9. **Synthesis of complex literature:** To facilitate understanding and summarization of complex academic material.
10. **Example generation:** To create illustrative examples of concepts and techniques.
11. **Review and feedback:** To receive suggestions for improving and refining the work at different levels of rigor.
12. **Translation:** To translate content between languages.

I affirm that all the information and content presented in this dissertation are the result of my own research and individual effort, except where explicitly stated otherwise and properly credited (including appropriate references and clear acknowledgment of the use of ChatGPT or similar tools).

I am aware of the academic and ethical implications of submitting non-original work and accept the consequences of any violation of this declaration.

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