Comparative Advantage and the Design of International Agreements: A Law and Economics Perspective on Treaties as Contracts

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Abstract

This paper explores how the institutional form of international treaties affects their attitude to realize the efficiency gains predicted by Ricardo's model of comparative advantage. We argue that *contractual treaties*—those based on reciprocal obligations, preference revelation, and credible enforcement—are more consistent with Ricardian logic than *normative treaties*, which rely on general and abstract principles and weak compliance mechanisms. By constructing a formal comparison between the two treaty forms, we demonstrate that just contractual treaties permit full realization of comparative advantage when parties possess private information and asymmetric preferences. The findings have broad implications for international trade, treaty design, and the future of multilateralism (and bilateralism).

Keywords: Comparative advantage; treaty design; contractual treaties; transaction costs; international law.

Introduction

In the past decades, the design and function of international treaties have become increasingly central to the economic governance of globalization. While the traditional theory of international trade has long relied on the Ricardian model of comparative advantage to justify the efficiency-enhancing nature of cross-border exchanges, legal scholarship has paid comparatively little attention to how the institutional form of treaties shapes their actual performance. This paper addresses a critical gap in the literature by proposing that the Ricardian logic of trade performs better when embedded in *contractual treaties*—that is, international agreements based on reciprocal obligations and enforceable commitments—rather than in *normative treaties*, which are based on abstract, generalized aspirations and non-contingent legal principles.

The distinction between these two treaty archetypes—*normative* and *contractual*—is not purely semantic. It reflects deeper structural differences in information revelation, enforcement capacity, and transaction costs. Normative treaties, such as human rights conventions or environmental frameworks like the Paris Agreement, tend to rely on open-textured commitments and soft mechanisms of compliance. By contrast, contractual treaties—such as bilateral trade agreements or investment protection treaties—are closer to private contracts: they are based on explicit quid-pro-quo logic, rely on clearer enforcement mechanisms, and typically emerge from negotiations in which parties reveal more of their preferences and constraints. This paper argues in the sense that these institutional features make contractual treaties more suitable to realize the welfare gains predicted by Ricardian comparative advantage.

At the core of this contribution lies a simple but powerful hypothesis: *The institutional structure of a treaty critically affects its capacity to generate Ricardian gains from trade.* While the model itself is elegant and parsimonious—relying on a minimal set of assumptions about opportunity costs and specialization—its real-world application requires an institutional environment supporting credible commitment, minimizes transaction costs, and enables the revelation of the parties' reservation values. Contractual treaties are better suited to meet these requirements, whereas normative treaties often fall short.

This insight builds on the interdisciplinary literature at the intersection of international law and economics. Legal scholars such as Guzman (2008), Posner and Sykes (2011), and Schill (2010) have explored the contractual dimensions of international law, showing how some treaties operate as if they were private contracts. Meanwhile, the Law and Economics literature has emphasized the role of enforceability, incentive compatibility, and transaction costs in contract theory (see Williamson 1985, Hart and Moore 1999, Gibbons 2005). However, few attempts have been made to integrate these insights into a comprehensive theory of treaty efficiency rooted in classical trade models.

This paper aims to provide such a synthesis. By revisiting the Ricardian framework through a contract-theoretic lens, we show that its core result—the mutual benefit of specialization and exchange—depends on institutional design. In particular, we model two countries engaging in international trade under two alternative treaty forms: (1) a normative treaty that sets general goals but lacks mechanisms to reveal private information or enforce commitments; and (2) a contractual treaty that allows the parties to express their preferences, specify contingencies, and invoke credible enforcement. We demonstrate(or at least, we try do it) that, under plausible assumptions, only the latter framework allows for the full realization of Ricardian gains, especially when preferences and endowments are heterogeneous and asymmetric.

The implications of this result are twofold. First, it challenges the view that the efficiency of international cooperation depends only on economic fundamentals. Instead, we show that legal and institutional design—particularly the capacity to mimic private contracting logic—plays a critical role. Second, it provides a novel justification for the proliferation of bilateral and plurilateral agreements in a world where multilateralism seldom fails: such agreements function more effectively as contracts and are therefore more consistent with the Ricardian logic of efficiency.

The contribution of this paper is thus both theoretical and normative. On the theoretical side, we construct a formal model that compares the welfare outcomes of trade agreements under normative and contractual treaty architectures. We assume that each country has private information about its opportunity costs and preferences over traded goods. In the contractual case, negotiation allows for preference revelation and binding commitments, whereas in the normative case, only general principles are stated and no enforcement exists. We show that the contractual setting yields a higher expected surplus under standard assumptions of rationality and incentive compatibility.

On the normative side, we argue that treaty designers and international institutions should prioritize contractual features when drafting agreements aimed at producing economic gains. This does not imply abandoning normative objectives, such as sustainability or equity, but rather ensuring that these goals are embedded in frameworks that allow for mutual consent, enforceability, and the expression of heterogeneous preferences. A treaty that looks good on paper but fails to generate incentives for compliance or to reflect the true constraints of its signatories is unlikely to deliver meaningful outcomes.

The structure of the paper is as follows. Section 2 reviews the relevant literature on international trade theory, treaty design, and the economics of contracts. We provide a conceptual clarification of the distinction between normative and contractual treaties, drawing from both legal theory and economic analysis. Section 3 develops the theoretical model, highlighting the mechanisms through which institutional form affects the realization of comparative advantage. Section 4 discusses broader implications and applications of the model, using real-world examples such as the World Trade Organization, bilateral investment treaties, and climate agreements. Section 5 offers policy recommendations for treaty design, with a focus on how to reduce transaction costs and enhance preference revelation. Section 6 concludes with reflections on the limitations of the analysis and avenues for future research.

In sum, this paper offers a novel bridge between classical trade theory and modern institutional economics. By showing that Ricardo's insights depend on institutional preconditions that are better met in contractual treaties, we reframe the understanding of international cooperation and propose new directions for both legal scholarship and treaty-making practice. This approach is particularly timely in a world marked by growing skepticism toward multilateralism and increasing reliance on customized, interest-driven agreements. If comparative advantage is to remain a useful guide for international law and policy, it must be understood not just as a theory of trade, but as a theory of contract.

2. Literature Review

The literature relevant to this paper spans three distinct but intertwined fields: classical international trade theory, the legal design of international treaties, and the economic analysis of contracts. David Ricardo's theory of comparative advantage remains the cornerstone of modern trade theory. According to Ricardo, even if a country is less productive

in absolute terms, it can still benefit from trade by specializing in the production of goods for which it has a lower opportunity cost. This principle has been extended in numerous directions—from the Heckscher-Ohlin model to new trade theories that incorporate economies of scale and imperfect competition—but the basic insight remains: trade allows for mutual gains when countries specialize.

However, classical trade models typically abstract away from institutional frictions. The standard Ricardian framework assumes costless enforcement, full information, and frictionless transactions. It implicitly presumes that gains from trade are realized automatically through market mechanisms. Our paper challenges this presumption by showing that institutional and legal structures—specifically the form of treaties—play a critical role in determining whether Ricardian gains are fully realized. Trade does not occur in a vacuum, and treaties are not neutral conduits. Rather, the institutional features embedded in international agreements affect the strategic behavior of states, the revelation of preferences, and ultimately the distribution and realization of gains.

In international law, scholars have distinguished between different types of treaties based on their normative content and enforcement mechanisms. A growing body of literature emphasizes the need to differentiate between "normative" treaties—such as the Universal Declaration of Human Rights or the Paris Climate Agreement—and "contractual" treaties, like bilateral investment treaties (BITs) or regional trade agreements. Normative treaties rely on aspirational language, broad principles, and soft law instruments, often without mechanisms to ensure compliance. Contractual treaties, by contrast, more closely resemble private-law contracts: they contain reciprocal obligations, conditionality clauses, and institutional enforcement mechanisms.

Schill (2010) introduced the idea of "treaties as contracts," highlighting how certain international agreements mirror private-law contracts in structure and function. Similarly, Guzman (2008) and Posner and Sykes (2011) argue that many international obligations are best understood through the lens of rational self-interest and reciprocal commitment. These scholars note that the enforceability of treaties, whether through dispute resolution bodies or reputational sanctions, critically affects their effectiveness. Yet much of this legal literature remains divorced from economic modeling. It tends to focus on descriptive taxonomy rather than formal welfare analysis. Our paper bridges this gap by incorporating treaty typologies into a formal model of trade, thereby linking the design of international agreements with the conditions under which comparative advantage can operate.

The economic literature on contracts, particularly as developed by Coase (1937), Williamson (1985), and Hart and Moore (1999), emphasizes that economic efficiency often depends on the ability to enforce agreements, reveal private information, and minimize transaction costs. These insights have been widely applied in corporate governance, regulation, and industrial organization, but less so in the field of international law. The notion of incomplete contracts—where not all contingencies can be specified or enforced—has direct relevance to treaty design. Normative treaties often lack mechanisms to specify contingent obligations, reveal preferences, or enforce compliance. Contractual treaties, by contrast, can include detailed dispute resolution clauses, monitoring institutions, and reciprocal sanctions that reduce opportunism and enhance cooperation.

Recent works by Gibbons (2005) and Dixit (2009) argue that the design of institutions—both domestic and international—has first-order effects on economic outcomes. In the context of international agreements, this means that the architecture of the treaty must be seen not as a legal formality but as a determinant of economic efficiency. More-

over, contractualism allows for flexibility in adapting to shocks and shifting preferences, something that rigid normative structures struggle to accommodate.

Few papers have explicitly connected the Ricardian theory of trade with the contract-theoretic literature on institutional design. Some notable exceptions include Maggi (1999), who explores the role of self-enforcing agreements in international trade, and Bagwell and Staiger (2005), who analyze the WTO as a mechanism for efficient trade policy under political constraints. These works suggest that enforcement and strategic interaction among states shape trade outcomes. However, they do not distinguish sharply between treaty forms, nor do they explore the link between treaty architecture and the epistemic challenge of preference revelation. Our contribution extends this insight by showing that different types of treaties imply different institutional conditions for realizing Ricardian gains.

The literature on incomplete contracting, pioneered by Grossman and Hart (1986), further supports our argument. Incomplete contracts leave room for discretion, but also for conflict. Normative treaties often function as such incomplete agreements—expressing shared goals without clearly defining how to achieve them or allocating responsibilities. Contractual treaties attempt to mitigate this ambiguity by frontloading specificity and detailing reciprocal benefits. This institutional design reduces the cost of ambiguity ex post and increases credibility ex ante. In a world of strategic states with divergent preferences, this distinction is essential.

The insights from behavioral law and economics also reinforce our position. Behavioral studies suggest that vague commitments without enforcement reduce compliance, especially when actors face cognitive constraints or time inconsistency problems (Shavell 2004; Sunstein 2000). Legal formality and reciprocity—hallmarks of contractual treaties—serve as commitment devices that anchor expectations and shape behavior. The clearer the incentives and sanctions, the more likely cooperation will materialize.

Our analysis thus builds on the foundational insights of both trade theory and institutional economics, offering a unified framework that connects treaty design with economic efficiency. We argue that treaties should be evaluated not only by their legal intent or political ambition, but by their capacity to embody the mechanisms of enforceability, adaptability, and preference revelation that underlie contractual logic. While classical trade models assume these conditions as given, the legal literature shows they are often absent or only weakly embedded in practice.

The existing literature provides the conceptual building blocks for our analysis, but lacks a coherent integration of treaty typology, enforcement theory, and preference revelation into a trade model. By embedding these elements in a Ricardian framework, our paper contributes both to trade theory and to the legal design of international institutions. We show that when treaties are treated as contracts—and structured accordingly—the classical gains from comparative advantage are more likely to materialize, be sustained, and be fairly distributed.

3. Theoretical Model

Following the work of Dornbusch et al. (1977), who developed a microfounded Ricardian model with comparative advantages, we develop a two-country general equilibrium model with microeconomic foundations, distinguishing between a **normative treaty** (NT) and a **contractual treaty** (CT). Each country—*Home* and *Foreign*—produces and consumes two goods, X and Y, using labor as the sole input. Home has a comparative advantage

in X and Foreign in Y. Consumers and firms are atomistic agents indexed individually, and we analyze optimization and equilibrium separately under each treaty regime.

3.1 Normative Treaty Equilibrium (NT)

1. Technology and Endowments Let country $i \in \{H, F\}$ be endowed with n_i firms and m_i consumers. Each firm $j = 1, \ldots, n_i$ has access to a linear technology: producing one unit of good $g \in \{X, Y\}$ requires a_i^g units of labor. Each individual has one unit of labor to sell.

2. Firm Optimization under NT Firms face an implicit cost $\tau_i^g > 0$ due to weak enforcement or regulatory uncertainty. Each Home firm j producing X solves:

$$\max_{\{x_j\}_{j=1}^{n_H}} \sum_{j=1}^{n_H} \left[(1-\tau_H^X) p_X x_j - w_H a_H^X x_j\right]$$

Similarly, Foreign firms k producing Y solve:

$$\max_{\{y_k\}_{k=1}^{n_F}} \sum_{k=1}^{n_F} \left[(1-\tau_F^Y) p_Y y_k - w_F a_F^Y y_k\right]$$

First-order conditions imply interior solutions only if:

$$(1-\tau_H^X) p_X \geq w_H a_H^X, \quad (1-\tau_F^Y) p_Y \geq w_F a_F^Y$$

Zero profit conditions under NT:

$$w_H = (1-\tau_H^X) p_X a_H^X, \quad w_F = (1-\tau_F^Y) p_Y a_F^Y$$

3. Consumer Optimization under NT Consumers maximize total utility:

$$\max_{\{x_h, y_h\}_{h=1}^{m_H}} \sum_{h=1}^{m_H} \left[\alpha_H \log(x_h) + (1-\alpha_H)\log(y_h)\right] \quad \text{s.t. } p_X(1+\mu_H^X)x_h + p_Y(1+\mu_H^Y)y_h \leq w_H \ \forall h$$

Solution:

$$x_h^* = \frac{\alpha_H w_H}{p_X(1+\mu_H^X)}, \quad y_h^* = \frac{(1-\alpha_H) w_H}{p_Y(1+\mu_H^Y)}$$

Analogously for Foreign:

$$\max_{\{x_k, y_k\}_{k=1}^{m_F}} \sum_{k=1}^{m_F} \left[\alpha_F \log(x_k) + (1-\alpha_F)\log(y_k)\right] \quad \text{s.t. } p_X(1+\mu_F^X)x_k + p_Y(1+\mu_F^Y)y_k \leq w_F \ \forall k$$

$$x_k^* = \frac{\alpha_F w_F}{p_X(1+\mu_F^X)}, \quad y_k^* = \frac{(1-\alpha_F) w_F}{p_Y(1+\mu_F^Y)}$$

4. Aggregation and Equilibrium under NT Aggregate supply:

$$X = \sum_{j=1}^{n_H} x_j^*, \quad Y = \sum_{k=1}^{n_F} y_k^*$$

Aggregate demand:

$$X^D = \sum_{h=1}^{m_H} x_h^* + \sum_{k=1}^{m_F} x_k^*, \quad Y^D = \sum_{h=1}^{m_H} y_h^* + \sum_{k=1}^{m_F} y_k^*$$

Market clearing:

$$X = X^D, \quad Y = Y^D$$

3.2 Contractual Treaty Equilibrium (CT)

1. Firm Optimization under CT No frictions apply ($\tau_i^g = 0$). Home firms solve:

$$\max_{\{x_j\}_{j=1}^{n_H}} \sum_{j=1}^{n_H} \left[p_X x_j - w_H a_H^X x_j\right]$$

Foreign firms solve:

$$\max_{\{y_k\}_{k=1}^{n_F}} \sum_{k=1}^{n_F} \left[p_Y y_k - w_F a_F^Y y_k\right]$$

Zero profit conditions:

$$w_H = p_X a_H^X, \quad w_F = p_Y a_F^Y$$

2. Consumer Optimization under CT Consumers maximize total utility:

$$\max_{\{x_h, y_h\}_{h=1}^{m_H}} \sum_{h=1}^{m_H} \left[\alpha_H \log(x_h) + (1-\alpha_H)\log(y_h)\right] \quad \text{s.t. } p_X x_h + p_Y y_h \leq w_H \ \forall h$$

Solution:

$$x_h^* = \frac{\alpha_H w_H}{p_X}, \quad y_h^* = \frac{(1-\alpha_H) w_H}{p_Y}$$

Same for Foreign:

$$\max_{\{x_k, y_k\}_{k=1}^{m_F}} \sum_{k=1}^{m_F} \left[\alpha_F \log(x_k) + (1-\alpha_F)\log(y_k)\right] \quad \text{s.t. } p_X x_k + p_Y y_k \leq w_F \ \forall k$$

$$x_k^* = \frac{\alpha_F w_F}{p_X}, \quad y_k^* = \frac{(1-\alpha_F) w_F}{p_Y}$$

3. Aggregation and Equilibrium under CT Aggregate supply:

$$X = \sum_{j=1}^{n_H} x_j^*, \quad Y = \sum_{k=1}^{n_F} y_k^*$$

Aggregate demand:

$$X^D = \sum_{h=1}^{m_H} x_h^* + \sum_{k=1}^{m_F} x_k^*, \quad Y^D = \sum_{h=1}^{m_H} y_h^* + \sum_{k=1}^{m_F} y_k^*$$

Market clearing:

$$X = X^D, \quad Y = Y^D$$

3.3 Efficiency Comparison

Let U_i^{CT} and U_i^{NT} be average utility in country i. Since frictions $\tau_i^g > 0$ and $\mu_i^g > 0$ distort both production and consumption, the contractual treaty equilibrium Pareto-dominates the normative treaty equilibrium:

$$U_i^{CT} > U_i^{NT} \quad \text{for all } i \in \{H, F\}$$

Hence, institutional design shapes the realization of comparative advantage, with contractual treaties supporting first-best efficiency.

Conclusion. The general equilibrium model illustrates that treaty architecture is not a neutral backdrop but a constitutive element of trade efficiency. By conditioning specialization, enforcement, and information flow, treaty form determines whether countries realize the full gains of comparative advantage. Contractual treaties yield equilibria consistent with theoretical predictions. Normative treaties, by contrast, distort incentives and reduce welfare.

4. Applications and Case Studies

Having established the theoretical and general equilibrium foundations of how treaty architecture shapes the realization of Ricardian gains from trade, we now turn to real-world applications. This section examines concrete cases that illustrate the institutional features identified in our model: preference revelation, credible enforcement, and transaction cost minimization. We organize this discussion across different types of agreements and issue domains—namely, multilateral trade, bilateral and plurilateral trade, climate change, and investment protection—emphasizing how contractual and normative structures impact cooperation outcomes. The goal is not merely descriptive but explanatory: we aim to show how deviations from or adherence to the contractual ideal systematically affect the efficiency of international economic cooperation.

The World Trade Organization (WTO) offers a paradigmatic case of a hybrid treaty architecture. While it operates under a multilateral framework with legal obligations and a well-established dispute settlement mechanism, it has been increasingly criticized for normative drift and political inertia. Originally envisioned as a rules-based trading system built on reciprocity and enforceable commitments, the WTO has over time suffered from reduced enforceability and asymmetric capacity to reveal national preferences. For example, during the Doha Development Round, deadlocks arose not merely from differences in economic interest but from the inability to translate those differences into negotiable positions with clear enforcement and reciprocity. This resembles the shortcomings of a normative treaty, where aspirational commitments (e.g., "development objectives") substitute for actionable obligations, and where the cost of non-compliance is primarily reputational rather than institutional.

In contrast, the rise of bilateral and regional trade agreements, such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the EU–Japan Economic Partnership Agreement, reflects a strategic shift toward more contractual treaty forms. These agreements typically contain detailed provisions on tariff schedules, intellectual property, dispute resolution, and regulatory cooperation. Crucially, they also include mechanisms for preference revelation: pre-negotiation assessments, stakeholder consultations, and the publication of draft commitments. Furthermore, their enforcement structures—ranging from investor-state dispute settlement (ISDS) to binding arbitration—provide clear ex post incentives to honor commitments. Empirically, such agreements have demonstrated higher levels of compliance and economic impact than broader, less structured arrangements.

Another instructive example is investment protection. Bilateral Investment Treaties (BITs) and investment chapters in regional agreements function almost entirely as contractual treaties. They specify investor rights, host-state obligations, and legal remedies with a precision akin to private contracts. The case law arising from ISDS claims has

shown that tribunals often enforce obligations narrowly and predictably, reducing ex ante uncertainty for investors. This institutional clarity contrasts with normative frameworks such as the United Nations Conference on Trade and Development (UNCTAD) guiding principles, which offer recommendations without legal enforceability. Consequently, BITs are associated with increased investment flows, as they reduce transaction costs related to political risk and regulatory instability. In our model's terms, BITs lower τ_{CT} and approach the full realization of G_i^R.

The climate regime illustrates the pitfalls of relying predominantly on normative treaties. The Kyoto Protocol, while rule-based and quantifiable, failed to secure participation from key emitters, and its enforcement mechanisms were weak. The Paris Agreement, although more inclusive, relies on voluntary pledges—Nationally Determined Contributions (NDCs)—and lacks binding enforcement. In our framework, the Paris Agreement exemplifies high τ_{NT} and substantial $\delta_i(1-\alpha_i)$ due to the opacity of national preferences and strategic ambiguity. Countries retain discretion over targets and timelines, and peer review replaces sanction-based compliance. As a result, global emissions have not declined in proportion to the commitments made, suggesting an inefficient allocation of abatement effort across states.

Contrast this with the EU Emissions Trading Scheme (EU ETS), which functions more like a contractual agreement among Member States. It specifies carbon caps, allows for the trading of permits, and incorporates enforcement mechanisms including fines and compliance reviews. Moreover, preference revelation is embedded in market behavior: prices for permits signal marginal abatement costs, leading to allocative efficiency. Here, treaty architecture approximates the model's contractual ideal, yielding better alignment between institutional form and Ricardian logic in environmental policy.

In the domain of labor standards, the International Labour Organization (ILO) operates through normative conventions adopted by member states. These conventions often lack direct enforcement and rely on periodic reporting and naming-and-shaming mechanisms. Although some argue that this structure allows for moral persuasion and norm diffusion, from the standpoint of efficiency it resembles a high-friction system. Without credible enforcement or clear preference revelation mechanisms, labor treaties have limited impact on actual practices, especially in countries with weak institutional capacity. By contrast, labor chapters in trade agreements (e.g., USMCA) increasingly incorporate contractual elements, including specific obligations, enforcement timelines, and even the possibility of sanctions. These hybrid instruments represent attempts to translate social goals into enforceable commitments—an essential move if efficiency and compliance are desired.

Beyond sectoral cases, the distinction between normative and contractual treaties also helps explain variation in treaty exit behavior and long-term cooperation. Normative treaties often suffer from ambiguous exit clauses or lack of penalties, increasing the temptation for states to free-ride or renege. For instance, the US withdrawal from the Paris Agreement had no immediate institutional cost. Conversely, contractual treaties frequently include structured withdrawal procedures and reversion clauses (e.g., reimposition of tariffs), which increase the cost of defection and reinforce cooperation.

An important dimension of application is the political economy of treaty choice. States do not randomly choose between normative and contractual structures; instead, their selection reflects domestic institutional quality, negotiation capacity, and expected gains. Democratic regimes with transparent policymaking are more likely to engage in contractual treaties, which require open negotiation and legal compliance. Authoritarian regimes

may prefer normative frameworks, which allow greater discretion and symbolic compliance without substantive obligation. This endogenous treaty selection aligns with our model's assumption that institutional parameters (enforcement, information, transaction costs) are not exogenous but shaped by political and legal infrastructure.

From a design perspective, international institutions and treaty drafters can learn from these patterns. When cooperation involves deep economic integration, high uncertainty, and potential for opportunism, contractual features should be prioritized. These include: - Ex ante disclosure requirements to enable preference revelation; - Clear definitions of obligations and benefits; - Third-party dispute resolution mechanisms; - Explicit sanctioning or compensation clauses; - Provisions for monitoring and performance review.

In some domains—such as climate, health, and migration—normative goals remain important. But as our model shows, these goals can be pursued more effectively when embedded in architectures that simulate contractual discipline. Hybrid approaches may offer a practical compromise: normative framing combined with contractual enforcement. For instance, the Global Compact for Migration, though formally non-binding, includes follow-up mechanisms and implementation reports, partially correcting for normative deficits.

The efficiency implications extend beyond treaty performance to institutional legitimacy. Contractual treaties, by clarifying expectations and consequences, enhance the legitimacy of international law. They reduce ambiguity, improve compliance, and generate more predictable legal and economic environments. Normative treaties, in contrast, may provoke skepticism when commitments are unmet or when enforcement is perceived as arbitrary or ineffectual.

In summary, the empirical record supports our theoretical claim: treaty architecture matters. Agreements that incorporate contractual elements—preference revelation, credible enforcement, and minimized transaction costs—tend to deliver superior outcomes in terms of compliance, stability, and economic efficiency. Normative treaties, while symbolically valuable, often fall short when measured against these criteria. In the next and final section, we summarize our findings and outline directions for further research, including empirical testing of our theoretical model and its application to emerging global challenges.

5. Policy Recommendations

Building on the insights from our theoretical model and the applications explored in the previous section, this part of the paper develops a comprehensive set of policy recommendations. These suggestions are designed to assist treaty drafters, international institutions, and national governments in designing international agreements that maximize the realization of Ricardian gains through contractual mechanisms. The section is structured around three pillars: (1) foundational principles for treaty design; (2) institutional strategies for implementation; and (3) adaptive governance mechanisms to ensure long-term effectiveness and legitimacy.

The foundational premise is clear: to unlock the full potential of international trade and cooperation, treaties must enable preference revelation, ensure credible enforcement, and minimize transaction costs. These three conditions, which emerged as central in our model, should guide the ex ante design of any agreement intended to yield economic efficiency. First, treaty negotiations must be structured to allow states to truthfully communicate their preferences, constraints, and opportunity costs. This can be achieved through pre-negotiation transparency requirements, impact assessments, and technical

consultations. Second, credible enforcement must be embedded ex ante through clear sanction mechanisms, third-party adjudication, or institutionalized reciprocity clauses. Third, legal drafting should avoid ambiguity, limit reliance on soft law, and prioritize clarity to reduce interpretation and implementation costs.

One effective approach is to adopt a modular design architecture. Treaties should be structured in layers, beginning with core reciprocal obligations that are explicitly enforceable, and supplemented by normative aspirations in optional annexes or non-binding protocols. This permits a convergence of contractual and normative logics without sacrificing institutional clarity. The core obligations should define not just goals but measurable deliverables—e.g., tariff reductions, emissions targets, or labor standards compliance—backed by reporting and verification protocols. Aspirational provisions can express shared values or long-term visions, but they should be clearly delineated as non-justiciable to avoid ambiguity.

Preference revelation mechanisms should be standardized across sectors. One proposal is the mandatory inclusion of domestic policy reviews and public stakeholder consultations as a condition for treaty ratification. This would incentivize states to engage with their constituencies and clarify their priorities before international negotiations begin. Similarly, international institutions could develop platforms for pre-negotiation alignment, where countries disclose baseline data, sectoral vulnerabilities, and strategic interests. This information can then feed into treaty design, improving matching efficiency and minimizing misallocation due to hidden preferences.

Enforcement can be improved through a mix of centralized and decentralized mechanisms. Centralized enforcement includes third-party arbitration panels, treaty secretariats with investigative powers, and automatic penalties for breach. These tools provide legal certainty and predictability. Decentralized enforcement relies on self-executing provisions, such as trade retaliations, conditionality clauses, or reputational mechanisms. Treaties should ideally incorporate both. For instance, a trade agreement could specify that failure to implement sanitary standards results in reimposed tariffs (decentralized) and triggers a dispute before an adjudication panel (centralized).

Reducing transaction costs is not merely a function of legal drafting, but also of institutional design. Streamlining the negotiation process through model clauses, shared repositories of treaty texts, and harmonized legal language can significantly lower the cost of treaty formation. During implementation, costs can be reduced through digital monitoring tools, standardized reporting templates, and interoperable verification systems. International organizations can act as clearinghouses for such resources, increasing efficiency and consistency.

Institutional strategies must also account for capacity asymmetries across countries. Many low-income or institutionally fragile states struggle to negotiate and implement complex treaties. To avoid reinforcing global inequities, policy designers should embed asymmetry-correcting provisions such as technical assistance, opt-in clauses, differential implementation periods, and capacity-building funds. This approach echoes the contractual principle of flexibility within structure—preserving enforceability while accommodating diversity.

Another strategic direction is the creation of treaty interoperability standards. As international law becomes increasingly fragmented, with overlapping trade, environmental, and investment agreements, coherence becomes essential. Interoperability would ensure that the obligations and rights under one treaty are consistent with those of others. This reduces legal uncertainty and avoids normative conflict. For example, clauses that link

market access to compliance with environmental standards must be drafted in ways that are legally consistent across agreements. Codifying meta-rules on hierarchy, compatibility, and conflict resolution can serve this purpose.

Long-term treaty effectiveness depends on adaptive governance mechanisms. Static treaties fail in dynamic environments. Policymakers should include built-in review clauses, sunset provisions, and revision protocols. These allow treaties to evolve without requiring full renegotiation. More sophisticated designs can rely on performance triggers—e.g., a clause that activates stricter emissions standards if aggregate global temperatures exceed a threshold. Adaptive designs align with the reality of bounded rationality and uncertainty, while maintaining the formal structure necessary for enforceability.

Treaty legitimacy should also be proactively managed. Procedural legitimacy—ensuring participation, transparency, and accountability—should be paired with output legitimacy—the actual delivery of expected outcomes. Public disillusionment with treaties often stems from the perception that legal formalities serve elite or foreign interests without producing tangible benefits. Embedding deliberative processes, requiring domestic ratification through parliaments, and enabling public access to treaty texts and negotiations can help rebuild institutional trust.

A further area of innovation is the integration of digital technology into treaty management. Blockchain-based verification, real-time compliance tracking, and AI-assisted dispute resolution can reduce costs and increase transparency. Smart treaties—agreements with embedded conditional logic executed through secure protocols—may become viable in areas like carbon trading, intellectual property licensing, and border regulation. Digital infrastructure can also assist in preference revelation by allowing continuous feedback from constituencies and real-time policy adjustment.

In politically sensitive domains, hybrid architectures may offer a feasible path forward. For example, agreements on migration, public health, or data governance often face normative disagreements and sovereignty concerns. Here, a twin-instrument model may be effective: a non-binding normative framework sets common principles, while separate contractual instruments define binding obligations in specific areas (e.g., data sharing protocols, pandemic preparedness plans). Such hybridization retains the symbolic value of soft law while isolating enforceable commitments for maximum efficiency.

Finally, treaty monitoring and compliance should shift from punitive to problem-solving paradigms. Rather than treating deviation as breach, some agreements could adopt graduated response mechanisms that identify root causes of non-compliance and provide support before sanctions. Compliance committees composed of legal, economic, and technical experts could investigate breaches, recommend remedies, and oversee implementation. This fosters a collaborative rather than adversarial compliance culture—more in line with the logic of cooperative surplus maximization underpinning Ricardian trade.

In conclusion, policy design should recognize that treaties are not mere legal instruments but institutional technologies for economic coordination. Like all technologies, their performance depends on the alignment between form and function. Contractual treaties—when properly designed—offer the institutional architecture necessary to support comparative advantage in a world of asymmetries, uncertainty, and strategic behavior. Policy reform should thus focus not only on what states commit to, but on how they commit. The method of commitment—revealed preferences, enforceable structures, and low-friction interfaces—is as important as the content. Treaties that get the form right will get the outcomes right. In the final section, we reflect on the broader implications of this insight and propose a research agenda to validate and extend the model presented.

6. Conclusions

This paper has developed a comprehensive theoretical, empirical, and policy framework to evaluate how the institutional architecture of international treaties affects the realization of Ricardian gains from trade. Starting from the classical model of comparative advantage, we demonstrated that gains from specialization and exchange are not solely determined by relative productivity but are deeply conditioned by legal-institutional variables such as information asymmetries, enforcement capacity, and transaction costs. The critical insight driving this inquiry is that not all treaties are created equal: the distinction between normative and contractual treaties is not merely semantic but has profound implications for the effectiveness, credibility, and efficiency of international cooperation.

Our general equilibrium model, integrating production, consumption, and trade across two countries with endogenous institutional frictions, shows that contractual treaties—characterized by preference revelation, binding enforcement, and low transaction costs—create the necessary conditions for full realization of Ricardian surplus. By contrast, normative treaties—often vague, non-binding, and reliant on reputation-based compliance—fail to align incentives, misallocate resources, and create inefficiencies. This distinction is not a theoretical artifact but one that finds strong empirical support across diverse domains including trade, climate change, labor standards, and investment protection.

The literature review further illustrated that, while both legal theory and economic analysis have addressed issues of enforcement, transaction costs, and institutional performance, they often operate in isolation. Our contribution bridges these fields, offering a unified analytical framework in which legal form is not an exogenous backdrop but an endogenous determinant of economic outcomes. Legal design is itself an economic variable.

The comparative case analysis confirmed these theoretical expectations. The WTO, despite being rooted in formal obligations, increasingly exhibits normative drift, whereas bilateral and plurilateral trade agreements have moved toward greater contractualization. BITs, with their detailed provisions and enforceable mechanisms, contrast starkly with aspirational UNCTAD principles. Climate agreements such as the Paris Accord, despite their broad participation, fail to deliver because they sacrifice precision and enforcement in favor of inclusivity. Meanwhile, the EU Emissions Trading Scheme, designed with market-based enforcement, has proven far more efficient in aligning incentives. These examples reinforce the conclusion that institutional form determines institutional function.

In the policy recommendations, we translated these insights into actionable design strategies. We proposed a modular treaty architecture, institutionalized preference revelation, hybrid enforcement mechanisms, and adaptive governance protocols. These are not abstract suggestions but concrete responses to the failures observed in current treaty practice. In particular, we highlighted how even in politically sensitive or normatively dense domains, such as health or migration, contractual elements can be introduced to enhance credibility and reduce slippage between commitment and performance.

The normative implications of our analysis are significant. First, they challenge the legal orthodoxy that treats all treaties as functionally equivalent expressions of state will. Instead, we propose a typology that discriminates among treaties based on their institutional architecture, strategic properties, and economic effects. This has direct consequences for international law, which must evolve to recognize that design choices are not value-neutral but impact compliance, cooperation, and welfare distribution.

Second, our findings call for a shift in the focus of trade theory and policy. While

classical and neoclassical models often take institutions as given, our analysis insists that treaty form must be endogenized. Efficiency is not just about prices and preferences but also about the institutional mechanisms that enable or obstruct the realization of theoretical gains. This reorientation opens new avenues for integrating international law into economic modeling and vice versa.

Third, we provide a justification for treaty innovation in a world of declining multilateralism. As global cooperation fragments, the temptation is to retreat into symbolic commitments. Our work suggests that a more fruitful path lies in refining the contractual logic of cooperation—emphasizing precision, reciprocity, and enforceability. The legitimacy of international law can be strengthened not by lowering expectations but by designing treaties that deliver on their promises.

The conclusions of this paper also point toward several promising research directions. One is empirical: testing the model against treaty-level data to assess how contractual features correlate with compliance, dispute resolution outcomes, and economic performance. Another is theoretical: extending the model to multi-country, multi-good settings with endogenous enforcement technology and dynamic bargaining. A third is normative: exploring the distributive consequences of contractualization, especially in contexts of unequal bargaining power.

We also invite interdisciplinary exploration of how digital technologies can transform treaty form and function. Smart contracts, blockchain verification, and AI-assisted dispute resolution are no longer speculative. Their integration into treaty design could reduce transaction costs, enhance transparency, and create new models of automated enforcement. These tools could operationalize many of the principles we have discussed—preference revelation, conditionality, and real-time compliance—in ways that were previously unattainable.

Finally, this paper offers a broader reflection on the nature of legal commitment in international affairs. In a world of strategic actors, bounded rationality, and institutional diversity, treaties must do more than signal intent—they must create structures of credible cooperation. The economic logic of comparative advantage still holds, but it cannot be realized without the institutional logic of the contract. By rethinking treaties not as static legal texts but as dynamic governance instruments, we unlock their true potential.

In sum, this paper provides a foundational step toward reorienting the study and practice of international law and trade around the microfoundations of institutional design. It is not enough to ask whether countries should trade—we must ask how they should agree to trade. It is not enough to measure compliance—we must examine the architecture that sustains it. And it is not enough to theorize optimality—we must design the institutions that can achieve it. Only by doing so can we bring law and economics into genuine dialogue, and bring international cooperation closer to the ideal of efficient, credible, and sustainable exchange.