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Treaty influencers: a computational analysis of the development of international investment law

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ABSTRACT

This article uses computational methods to analyse the development of the international investment law regime, seeking to understand how, when, and by whom change in treaty language occurs. The study uses a novel computational method to explore the influence of different states on the language of international investment treaties and the spread of language patterns. The analysis reveals a hegemony of Western European, rather than North American influence, and further highlights a clear early mover advantage for obtaining language spread. The article discusses the implications of these findings for the investment treaty system, particularly the limited impact of hard negotiating power compared to early entrance and convincing legal language.

INTRODUCTION

With more than 3000 treaties and tens of thousands of treaty provisions, international investment agreements present a fascinating puzzle. From a distance, they appear relatively homogenous, however up close, treaties exhibit considerable heterogeneity. While recent computational research shows significant reproduction, recycling, and reuse of old treaty provisions in subsequent treaties,[1] the corpus of newer treaties is not without innovation or evolution.[2] The basic principles remain the same, yet the balance between states' regulatory autonomy and investor protection is constantly under (re)negotiation,[3] as underscored by the ongoing debates on legal

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[1] See, e.g. Wolfgang Alschner and Dmitriy Skougarevskiy, 'Mapping the Universe of International Investment Agreements' (2016) 19 Journal of International Economic Law, 561.

[2] See, e.g. Wolfgang Alschner and Dmitriy Skougarevskiy, 'Consistency and Legal Innovation in the BIT Universe', SSRN Scholarly Paper ID 2595288 (Rochester, NY: Social Science Research Network, 2015); Markus Krajewski, 'Human Rights in International Investment Law: Recent Trends in Arbitration and Treaty-Making Practice' (2018) SSRN Electronic Journal 1–13. doi:10.2139/ssrn.3133529.

[3] Alexander Thompson, Tomer Broude, and Yoram Z Haftel, 'Once Bitten, Twice Shy? Investment Disputes, State Sovereignty, and Change in Treaty Design' (2019) 73 International Organization 859; Yoram Z Haftel and Alexander Thompson, 'When do States Renegotiate Investment Agreements? The Impact of Arbitration' (2018) 13 The Review of International Organizations, 25; Federico M Lavopa, Lucas E Barreiros, and M Victoria Bruno, 'How to Kill a BIT and Not Die Trying: Legal and Political Challenges of Denouncing or Renegotiating Bilateral Investment Treaties' (2013) 16 Journal of International Economic Law 869.

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and policy reform processes in the shadow of the so-called legitimacy crisis.[4] Moreover, and central to this article, there is an ongoing scholarly debate as to which states have shaped hegemonically the current regime and to what extent treaties reflect existing power asymmetries or the results of open negotiations.[5]

The purpose of this paper is to analyse the evolution in the legal instruments that make up the international investment law (IIL) regime, in order to understand *how, when*, and, especially, *through whom* change occurs. Using a detailed full-text analysis of 70,000 clauses across 3000 investment treaties, I use computational methods, especially machine learning, topic modelling, network analysis, and deep learning, to analyse the nature of states' influence on the language of international investment treaty law (ITL). The study extends and challenges existing empirical research on treaty development by tracing the development and dispersion of language itself. By temporally tracing the language at a granular level back to its originators, we can better understand how influence ebbs and flows through the system. The article relies on data from the Electronic Database of Investment Treaties (EDIT) project[6] and incorporated into the PluriCourts Investment Treaty Arbitration Database.[7]

Therefore, the overall aim of the article is to enhance our sociological and theoretical understanding of the development of the investment law system: computational analysis provides insights into large-scale patterns and probabilistic relationships between states, which can be used to supplement doctrinal and international relations literature to better understand the systemic change and the identity of the system's drivers and powerbrokers. The article also complements the growing use of quantitative and computational methods to measure how impactful arbitrators, lawyers, and law firms are in driving change in investment arbitration.[8]

After conducting a literature review (Literature review section) and presenting the text-as-data computational methodology (Methodology section), the article continues in three main parts. First, in the Drafters of new language section, I analyse the degree of variation and innovation states applied to their treaties. The key finding is that the widespread impression that the USA has a leading and significant influence on investment law must be corrected—it is dwarfed by its European counterparts, which exhibit collectively almost 25 times more influence on clause-level development. Moreover, I find that the legal language is exceptionally sticky over time, with few treaty-based innovations after the turn of the millennia. Second, in the Conclusion: a general pattern section, I present a large-scale and diachronic analysis, which shows the influence of different states and regions over time. Using a cross-treaty examination of the influence throughout the system's history, I illustrate how the original European actor's influence has

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[4]   See e.g. Anthea Roberts, 'Incremental, Systemic, and Paradigmatic Reform of Investor-State Arbitration' (2018) 112 American Journal of International Law 410; Susan D Franck, *The Legitimacy Crisis in Investment Treaty Arbitration: Privatizing Public International Law Through Inconsistent Decisions* (2005); Thomas Dietz, Marius Dotzauer, and Edward S Cohen, 'The Legitimacy Crisis of Investor-State Arbitration and the New EU Investment Court System' (2019) Review of International Political Economy 1; Charles N Brower and Stephan W Schill, 'Is Arbitration a Threat or a Boon to the Legitimacy of International Investment Law?' (2008) 9 Chicago Journal of International Law 29; Malcolm Langford and others, 'Special Issue: UNCITRAL and Investment Arbitration Reform: Matching Concerns and Solutions: An Introduction' (2020) 21 The Journal of World Investment & Trade 167; Tarald Laudal Berge, 'Dispute by Design? Legalization, Backlash, and the Drafting of Investment Agreements' (2020) 64 International Studies Quarterly 919; Daniel Behn, Ole Kristian Fauchald, and Malcolm Langford, 'The International Investment Regime and Its Discontents', in Daniel Behn, Malcolm Langford, and Ole Kristian Fauchald (eds), *The Legitimacy of Investment Arbitration: Empirical Perspectives* (Cambridge University Press, Cambridge 2022) 39–82.
[5]   See overview in the Literature review section.
[6]   Wolfgang Alschner, Manfred Elsig, and Rodrigo Polanco, 'Introducing the Electronic Database of Investment Treaties (EDIT): The Genesis of a New Database and Its Use' (2021) 20 World Trade Review 73.
[7]   Daniel Behn and others, *PluriCourts Investment Treaty and Arbitration Database (PITAD)* (Pluricourts Centre of Excellence, University of Oslo, 2019).
[8]   Gus Van Harten, 'Arbitrator Behaviour in Asymmetrical Adjudication (Part Two): An Examination of Hypotheses of Bias in Investment Treaty Arbitration' (2015) 53 Osgoode Hall L J 540; Sergio Puig, 'Social capital in the arbitration market' (2014) 25 European Journal of International Law 387; Malcolm Langford, Daniel Behn, and Runar Hilleren Lie, 'The Revolving Door in International Investment Arbitration' (2017) 20 Journal of International Economic Law 301; Runar Hilleren Lie, 'The Influence of Law Firms in ISDS', in Ole Kristian Fauchald, Daniel Behn and Malcolm Langford (eds), *The Legitimacy of Investment Arbitration: Empirical Perspectives* (Cambridge University Press, Cambridge 2022).

not only largely formed the system but also slightly weakened over time with the economic rise of states in the Global South, particularly in Asia and South America. Finally, in Appendix, I discuss how these large-scale patterns have influenced and will continue to shape the investor state dispute settlement (ISDS) system.

LITERATURE REVIEW

To understand the complex development of IIL, it needs to be studied from multiple methodological perspectives. Moreover, analytically, its evolution can be seen through the prism of two separate axes. The first is qualitative, the development of substantive provisions, in other words, the invention of new language. The second is quantitative, the degree to which such language is diffused and incorporated in new treaties. As we shall see, both axes are key analytical features for understanding how influence is wielded in the investment system.

In a comprehensive history of the rise of IIL, St John points to the early and active role of the International Centre for Settlement of Investment Disputes, based at the World Bank, in the development, promotion, and uptake of model treaties.[9] Likewise, Elkins, Guzman, and Simmons show using quantitative analysis that states with World Bank–led structural adjustment programmes were more likely to sign investment treaties, often as an explicit or implicit condition for loans.[10] The same article, and other research, highlights the corresponding motivations of states and their competitive behaviour. Elkins, Guzman, and Simmons find that a State's competitive behaviour is equally important, whereby quantitative analysis shows that states may be incentivized to sign agreements to avoid their regional competitors gaining an advantage.[11] Jandhyala, Henisz, and Mansfield argue though that such rational and competitive behaviour has only emerged since 2001 and was preceded instead by two earlier and different waves of diffusion in the investment system.[12] The first was triggered by a need to solve inconsistency in legal provisions, such as the definition of investor, or the extent of the fair and equitable treatment (FET) clause, and in the second, bilateral investment treaties (BIT) became the de-facto global standard for national investment policy, triggering a massive uptake across the world (Fig. 1). A competitive and rational logic for states only emerged once the cost of treaties (i.e. actual litigation) became clear.[13]

However, the primary focus in this article is not the general explanation as to why states sign treaties, but rather which states shape the development and diffusion of treaty text. Moreover, the motivations of states for negotiating and signing treaties are only one indicator of the likely influence on the content of the actual treaties. Other explanations can include the contagiousness or attractiveness of rules, the role of economic and military power, and diplomats' individual competences and incentives.[14] Beyond the issues of influence and power, understanding how language spreads may provide insights into two strands of ongoing debate in

[9] Taylor St John, *The rise of investor-state arbitration: politics, law, and unintended consequences* (1st edn, United Kingdom: Oxford University Press, Oxford, 2018).

[10] Zachary Elkins, Andrew T Guzman, and Beth A Simmons, 'Competing for Capital: The Diffusion of Bilateral Investment Treaties, 1960–2000' (2006) 60 International Organization 811.

[11] ibid.

[12] Srividya Jandhyala, Witold J Henisz, and Edward D Mansfield, 'Three Waves of BITs: The Global Diffusion of Foreign Investment Policy' (2011) 55 Journal of Conflict Resolution 1047.

[13] ibid.

[14] Beth A Simmons, 'Bargaining over BITs, Arbitrating Awards: The Regime for Protection and Promotion of International Investment' (2014) 66 World Politics 12; Eric Neumayer, Peter Nunnenkamp, and Martin Roy, 'Are Stricter Investment Rules Contagious? Host Country Competition for Foreign Direct Investment through International Agreements' (2016) 152 Review of World Economy 177; Timothy Meyer and Tae Jung Park, 'Renegotiating International Investment Law' (2018) 21 Journal of International Economic Law 655; See Haftel and Thompson, above n 4, When do states renegotiate investment agreements?; Todd Allee and Clint Peinhardt, 'Evaluating Three Explanations for the Design of Bilateral Investment Treaties' (2014) 66 World Politics 47; Todd Allee and Clint Peinhardt, 'Delegating Differences: Bilateral Investment Treaties and Bargaining Over Dispute Resolution Provisions' (2010) 54 International Studies Quarterly 1; Lauge N Skovgaard Poulsen and Emma Aisbett, 'Diplomats Want Treaties: Diplomatic Agendas and Perks in the Investment Regime' (2016) 7 Journal of International Dispute Settlement, 72.
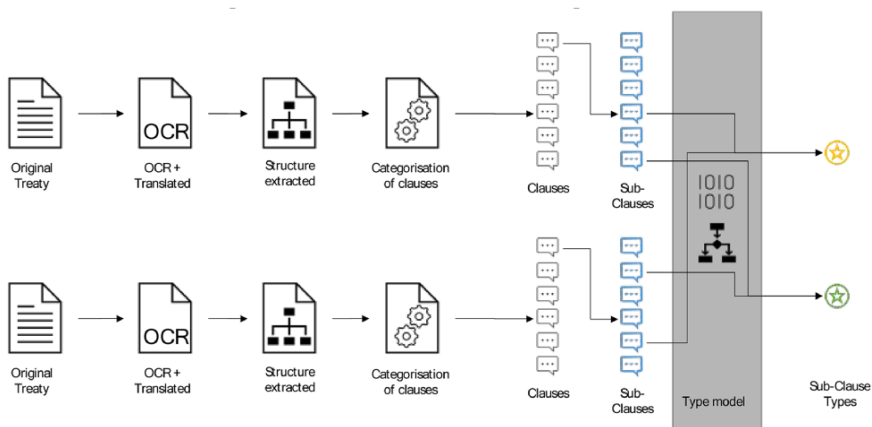
Figure 1. Illustration of the various steps for extracting, processing, categorizing, and grouping the clause variants.

the IIL community: the fundamental question of whether IIL is in fact a system, and second, if this is the case, whether this system is converging or diverging.[15] In his 2009 book, Schill develops a theory that there are systemic forces within IIL causing the system to converge and multilateralise.[16] Footer summarizes this theory as follows:

> Schill's concept of multilateralism rests on the idea that the rules and standards of investment protection, found in a plethora of BITs and similar investment instruments, that is, the full spectrum of IIAs, have become generalized and apply equally to all participating actors, irrespective of their two-party provenance in a BIT or another investment.[17]

Schill sees a common thread through all components of the IIL system from treaty language, and the use of the most favoured nation (MFN) clause, to the panel's use of jurisprudence, as a multilateralization mechanism that will ultimately lead to further convergence. He argues that due to the multifaceted and decentralised design of IIL, the system converges, tilts inevitably and naturally, towards a more monolithic structure.[18] Schill followed up with a broader analysis in his 2011 article, where he argues that tribunals create a system of persuasive and non-binding precedents, effectively creating an analogue to a multilateral treaty.[19] Schill finds that five factors particularly drive this change: direct access for investors to ISDS, states' limited influence on proceedings, limited review of awards, rules of enforcement, and the vagueness of treaty rights.[20] He further argues that this creates normative exceptions for the users of the system, which in turn frame further developments of IIL in the light of these expectations.[21]

[15]   See e.g. Wolfgang Alschner and Dmitriy Skougarevskiy, 'Convergence and Divergence in the Investment Treaty Universe – Scoping the Potential for Multilateral Consolidation' (2016) 8 Trade, Law and Development 152; John Beechey and Antony Crockett, 'New Generation of Bilateral Investment Treaties: Consensus or Divergence?', Contemporary Issues in International Arbitration and Mediation: The Fordham Papers (2008) (2009), 5; Stephan W Schill, *The Multilateralization of International Investment Law* (Cambridge University Press, Cambridge 2009).
[16]   See n 16, above.
[17]   Mary E Footer, 'International investment law and trade: the relationship that never went away', in Freya Baetens (ed), *Investment Law within International Law* (Cambridge University Press, Cambridge 2013) 259–297, at 283–284.
[18]   See n 16, above.
[19]   Stephan W Schill, 'System-Building in Investment Treaty Arbitration and Lawmaking' (2011) 12 German Law Journal 1083.
[20]   ibid 1087.
[21]   ibid 1109.

An alternative systematic perspective was introduced by Dupont and Schultz. They conceptualized IIL as a political system inspired by David Easton's framework for political analysis.[22] They model each group of actors as agents who ultimately wish to maximize their own utility and describe how they achieve this by creating inputs for the other actors and responding to the corresponding outputs. Using this framework, they argue that the states are the most influential actors, but that they use their influence sparsely. Investors, along with the arbitrators, are, however, found to be particularly efficient at influencing the system towards their own preferences.[23] Furthermore, they find that this creates a series of continual and interconnected feedback loops, where the actors systematically shape the system to better correspond with their incentives.[24] While not explicitly stated by Dupont and Schultz, the networks created by the multitude of feedback loops appear to exhibit systematic effects in and of themselves.

Institutional isomorphism, originally coined by DiMaggio and Powell in 1983, provides a potentially complementary explanation to IIL systemic evolution.[25] This theory posits that institutional models tend to congregate and homogenize on the global arena. As new actors enter, they appear to emulate and eventually institutionalize the general models.[26] Although this model may fit well with new actors entering the IIL system, perhaps particularly during the 1990s where a broad range of actors entered, Alschner theorizes that historical sociology and path dependence may be a more accurate model for IIL and argues that a combination of cognitive biases, socialisation, and a general preference for efficiency entrenches this self-reinforcing pattern on the development of treaties.[27]

From a methodological perspective, scholarship on the textual development can be placed in four categories. The *first* branch focuses on the development and structure of the legal texts themselves, through a doctrinal and history-oriented approach. This research is characterized by its close reading and analysis of legal provisions, but the scope of material reviewed is often limited. Beechy and Crockett provide an excellent example of this field of research. They analyse whether *new generation* treaties (post-2004 US Model BIT according to their definition) are diverging, converging, or neither of the above and particularly as a result of discussions related to the renegotiations of the North American Free Trade Agreement (NAFTA).[28] They find that states diverge, to a degree, from previous practice in key areas, often to address issues that have come up in dispute settlement. They also find that the traditional West European capital exporters such as the UK, France, Germany, the Netherlands, and Switzerland appear to be less inclined than the USA and Canada to radically reform their treaties. Looking further back, Alvarez pinpoints the specific role of the USA. Focusing on the rise of expansive FET and MFN clauses in BITs, he claimed:[29]

> The U.S. Model BIT of that period [early 1980s] set out to regulate the State. It set a new standard for investor protection that became widely emulated when the Berlin Wall fell and countries donned Thomas Friedman's "golden straightjacket" as everyone sought to at least

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[22] Cédric Dupont and Thomas Schultz, 'Towards a New Heuristic Model: Investment Arbitration as a Political System' (2016) 7 Journal of International Dispute Settlement 3.

[23] ibid.

[24] ibid.

[25] Paul J DiMaggio and Walter W Powell, 'The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields', (1983) 2 American Sociological Review 48, 147.

[26] ibid.

[27] Wolfgang Alschner, 'Locked in language: historical sociology and the path dependency of investment treaty design', Research Handbook on the Sociology of International Law (2018) <http://www.elgaronline.com/view/edcoll/9781783474486/9781783474486.00024.xml>, 350.

[28] John Beechey and Antony Crockett, 'New Generation Of Bilateral Investment Treaties: Consensus Or Divergence?', Contemporary Issues in International Arbitration and Mediation: The Fordham Papers (2008) (2009), at 5.

[29] Jose E Alvarez, 'The Return of the State' (2011) 20 Minnesota Journal of International Law 223.

appear a capitalist. Most of the US BIT's measures to protect investors became standard during the golden age of the proliferation of BITs, namely the 1990s.[30]

As is clear, Alvarez argues that the language of the US model BIT was deeply influential, with its measures becoming a standard for treaties created in the last decade of the 20th century.

These findings are augmented in a *second* body of research that is quantitative and based on coding of different legal features found in the treaties. While this research addresses a wider scope of material, albeit with a higher level of abstraction, it is primarily focused on the legal functions expressed in treaty text. In 2014, using regression analysis, Allee and Peinhardt provide support for the hypothesis that capital-exporting states use their bargaining power to create strong investor protections and ensure that this language is enforceable.[31] Likewise, in 2009, they found that dispute settlement clauses are shaped by the political sentiment in countries that primarily engage in outward investment, rather than the interests of the states that host the investments.[32] In addition, Allee and Lugg found that the largest actors have a significant asymmetric influence in such negotiations, with 75% of the BITs concluded precisely reflecting the model BITs of capital-exporting states. In situations where the asymmetry of power between states was high, they identified direct reproduction of up to 95%.[33]

Moving beyond the legal text, and with a greater focus on the process of negotiation, a *third* and more qualitative body of research examines the role of the negotiating parties shaping treaty text. Drawing on a large series of interviews and text analysis, Berge and Stiansen analysed the use of model agreements and bureaucratic capacity in shaping IIL.[34] They found a clear link between preference obtainment, model agreements, and the bureaucratic capacity of the State that achieved to negotiate their language into the final agreement.[35] They conclude that states with greater bureaucratic capacity, which they argue is closely connected to State's economic position, have a higher likelihood of achieving their preferences in BIT negotiations.[36] Haftel et al. extend this premise in their 2023 article. They find that states with greater negotiation and ISDS experience are able to translate this experience into preferential changes in treaty language.[37] Similarly, Poulson and Aisbett found through interviews and empirical studies that diplomats have individual incentives such as career advancement, travel, and increased income to negotiate and conclude treaties.[38] Unless the negotiator has either a strong State or strong bureaucratic support, this may incentivize negotiators to accept stronger states' less favourable model clauses.[39]

Due to the vast corpus size of the International Investment Agreements (IIAs), and entangled interactions between them, large-scale studies of treaty content using computational methods have emerged gradually. This *final* body of research expands both the scope and the depth of analysis to shed further light on the intricacies of the investment universe. As these studies often take an inductive approach to the study of investment law, they have the ability both to empirically evaluate existing hypotheses and to allow the patterns of the data revealing new insights.[40]

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[30]   ibid 232.
[31]   See n 15, above.
[32]   See n 15, above, delegating differences.
[33]   Todd Allee and Andrew Lugg, *Do BITs Reflect the Interests of Powerful States?* (2016).
[34]   Tarald Gulseth Berge and Øyvind Stiansen, 'Bureaucratic Capacity and Preference Attainment in International Economic Negotiations' (2022) Review of International Organization 1–13.
[35]   ibid.
[36]   ibid.
[37]   Yoram Z Haftel, Morr Link, and Tomer Broude, 'Last Year's Model? Investment Arbitration, Negotiation, and the Gap Between Model BITs and IIAs' (2023) Journal of International Economic Law jgad021.
[38]   See n 15, above, Diplomats Want Treaties, 88–90.
[39]   See n 15, above, Diplomats Want Treaties.
[40]   Susan D Franck, 'Empirically Evaluating Claims about Investment Treaty Arbitration' (2007) 86 North Carolina Law Review 1, 13–14; Wolfgang Alschner, *Investment Arbitration and State-Driven Reform: New Treaties, Old Outcomes* (University Press, Oxford 2022), 24.

The seminal contribution in this category is Alschner and Skougarevskiy's 2016 *Mapping the Universe of International Investment Agreements*.[41] In this paper, a methodology for mapping treaties through textual similarity was developed, seeking to efficiently identify and track patterns, consistency, and diffusion across a vast empirical dataset of 2150 treaties from 1959 to 2014. The authors found ample patterns of similarity across the treaties, ranging from pure copying and pasting to contextual and linguistic similarities between treaties of different states. Moreover, language originating from traditional capital-exporting states was found to permeate particularly the design and drafting of other treaties.

Alschner followed up on these results by conducting an in-depth study of the path dependency and historical sociology of treaty drafting.[42] In this dual-purpose paper, he conducted an in-depth theoretical study of the mechanisms and history that drives treaty drafting, as well as presents an empirical case study of the development of the FET clause. After the FET clause first appeared in the USA–Germany Friendship, Commerce and Navigation Treaty in 1954, as a lingual compromise, he finds a clear path dependency as it spreads through subsequent US agreements, before being picked up by the 1967 Organisation for Economic Co-operation and Development (OECD) Draft Convention on the Protection of Foreign Property.[43] Furthermore, Alschner finds that after a slow start, several western states pick up this language, and in the 1990s, the number of treaties with the OECD formulation expanded exponentially.[44] Finally, he shows that in the last decades, the path dependency continues as states still include the clause, but tend to undertake minor adjustments rather than dropping or significantly reshaping it.[45]

In a similar large-scale study of 1200 BITs by Manger and Peinhardt, the focus was instead the level of legal precision (level of detail in each clause) in treaties over time. Using custom text matching software, they find an increasing trend in precision, particularly driven by capital-exporting countries.[46] Yet, despite such dynamics, using a full computational text analysis of FET clauses in 1526 BITs and 67 model BITs, Waibel found a significant 'stickiness' in the formulation of the FET provisions over time.[47] He argues that this is due to the boilerplate nature of the language in these provisions and that significant efforts to modify its formulation are only found in very recent treaties and drafts. Montal, Potz-Nielsen, and Sumner offer an explanation for such stickiness. Through a computational analysis based on the United Nations Conference on Trade and Development mapping project, they conduct a preference analysis of investor protection in 1144 BITs. This suggests that countries possess clear and consistent preferences concerning treaty provisions over time, which is reflected in the treaties as increased stickiness.[48]

In his 2022 book, Alschner expands on his previous work and undertakes a large-scale computational study of the entire universe of investment law. Similar to the approach in this article, Alschner tracks treaty design development over time and puts in the larger context of how these variations affect the system in practice.[49] He finds that while much development can be framed within the concept of gap-filling, the practical results of innovation appear to be nullified by precedent, custom, and the application of MFN clauses.[50] Alschner further provides a convincing argument for the use of computational methods to inductively study the system—as

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[41]   See n 2, above.

[42]   See n 28, above, locked in language.

[43]   ibid 359.

[44]   ibid 361.

[45]   ibid 363.

[46]   Mark S Manger and Clint Peinhardt, 'Learning and the Precision of International Investment Agreements' (2017) 43 International Interactions 920.

[47]   Michael Waibel, 'Fair and Equitable Treatment as Boilerplate' (2019) 30 American Review of International Arbitration; ibid 1–13.

[48]   Florencia Montal, Carly Potz-Nielsen, and Jane Lawrence Sumner, 'What States Want: Estimating Ideal Points from International Investment Treaty Content' (2020) 57 Journal of Peace Research 679.

[49]   Wolfgang Alschner, *Investment Arbitration and State-Driven Reform: New Treaties, Old Outcomes* (Oxford University Press 2022), 23–46.

[50]   See n 41, above, Investment Arbitration and State-Driven Reform.

he states 'Let the treaties speak for themselves'.[51] He further argues that this method of finding patterns in the text-as-data corpus, and then subsequently creating models of explanation, provides researchers with a better pathway towards describing and analysing such a complex system.[52] Finally, Alschner provides in-depth empirical support for Alvarez's claim of US influence.[53] Through a computational full-text study of treaties, he argues that the treaty structure and features from American model treaties have become increasingly influential in ITL over the last decades, leading to an 'Americanization' of ITL. Alschner finds that the USA has used its models and treaties to increase contractual completeness by adding more features to their agreements.[54] He further finds evidence that these structural changes appear to permeate throughout the ITL system.[55]

Drawing these studies together, one can garner two preliminary conclusions. The first is that capital-exporting states appear to play a key role in developing and diffusing text, but the extent of their influence and which states are most influential remain unclear, although some scholars point decisively the direction of the USA. The second is that it is possible to doctrinally, quantitatively, and computationally trace selected clauses, but it has so far been constrained to a small subset of provisions or a specific element of development.

These two observations provide the departure point for this article, which aims at computational and systemic macro-analysis of the development of ITL. It aims to create a full computational and dynamic map of the history of treaties. In itself, it not only provides a contribution to current literature but also allows us to determine who is influencing the system, what the major areas of development are, and when these occurred.

METHODOLOGY

The core idea of this paper is simple: identify treaty provisions that are similar, place these on a timeline, use the available metadata on their parent treaties to connect them, and then quantify the connections between them. In other words, the aim is to construct and analyse an evolutionary family tree of treaty clauses. A sophisticated pipeline was therefore created and applied to extract structured information from the treaties. For a full description of the methodology applied and technical details, see the 2023 companion article that describes the underlying dataset, infrastructure, and methodology for analysis.[56]

The data used for this analysis come from the World Trade Institute EDIT dataset. At the time of writing, it contains 3617 treaties of which 3239 are BITs[57] and is currently the most complete collection of BITs. While neither authoritative nor entirely complete (it is missing 143 treaties),[58] it is the most comprehensive collection of treaties currently available. To ensure that the comparison is not skewed, I do not include model treaties in the sample. While these models are excellent examples of states intents, they have no direct legal effect and are not universally available across states.

Using this dataset, I subsequently processed the text, analysed the full corpus, and categorized each clause into groups of similarly worded subclauses (Fig. 1). The clauses are first placed into their legally relevant categories, such as conflict resolution or expropriation. From each of these categories, a machine learning–based topic model that uses a text similarity algorithm assigns each subclause to a variant group. Variations in these groups range from as few as two variations

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[51]   ibid 12.
[52]   See n 50, above.
[53]   See n 49, above, 81–120.
[54]   ibid.
[55]   ibid.
[56]   Runar Lie, *A Computational Approach and Dataset for Analysing International Investment Treaties* (2023).
[57]   See n 7, above, Introducing the EDIT.
[58]   ibid Table 1.

up to 250 for a given clause category.[59] The computational analysis is subsequently validated by a manual review of the groupings. This manual review was used to fine tune the threshold values for considering clauses as part of the same group. The final threshold was set to a level that allows for some variations but retain clauses that have a similar structure and wording in the same groups. While this means that some minor linguistic changes that may represent larger legal innovations are lost, it ensures that the influence of each treaty is accurately tracked.

The next step in the process was to identify all instances of each subclause and place them on a timeline. This provides a useful overview on a temporal scale as to when the clause variant has been used. Afterwards, this timeline was branched based on the parties of the treaties obtained from the treaty metadata. This will allow us to track which treaties are likely to have inherited their provision from a previous treaty by one of the treaty parties. It further highlights orphans, i.e. provisions that have no clear inheritance.

Several analytical techniques were then applied to extract information from the generated branches. The first was tracking the *origin* of the subclause variant. By observing which treaty, the subclause first appeared in, we can deduce the likely originators of the innovation.[60] However, as there are always two or more parties to the treaties, establishing which State is the 'true author' proved to be a challenge. This is further complicated by the negotiation process in the treaty drafting. In order to explore which states are the originator of a clause, an analysis was made of the subsequent frequency of use of that clause by other states. For convenience, I assume that if one of the states is a consistent subsequent user of a given clause variant, and among the original authors of the clause, it is likely that they are the originator of the subclause type.

The second was the location of *dispersion* points as illustrated by the dots in Fig. 2. These points indicate when the subclause tree branches, and a State other than the originator, use the subclause in a treaty that is not with that of the originator. This branching commonly occurs multiple times in a subclause's lifetime. By observing how many times and how often branches are made, we can gain an impression as how much dispersion is occurring. By measuring the length and complexity of the branches, the influence of originators and branchers can be established.

Finally, using the data generated from the previous techniques, I calculated scores and indicators to quantify developments in the system. By aggregating these scores based on the State and region, I provided total scores on the influence of each state and region. This was done on a temporal scale and provides information on which countries are influential and how such an influence changes over time.

The score provides an indication of how well a certain section of language proliferates throughout the system. While this may give some insights into its popularity, the reader should be aware that it solely provides information of quantity, not necessarily the real-life influence of the State or treaty in question. A hypothetical example of this would be that a paragraph of language that appears in every treaty, except those that have been used for litigation, would score significantly higher than a piece of language that has *only* been used in litigated treaties. The real-world effect of the latter language would most likely be far higher, but the scores will only reflect the internal perspective of the treaty universe. Similarly, the methodology calculates the spread of individual pieces of language exclusively. It does not track the overall structure of the treaties. While this excludes analysis on innovations in the overall structure, such as inclusions or exclusions of a type of clause, or a structural reorganization, it allows for a clear analysis of

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[59] Dimo Angelov, 'Top2Vec: Distributed Representations of Topics' (2020) arXiv:200809470 [cs, stat].
[60] When this article speaks of *innovation*, it is in a neutral form, i.e. that something new, that did not exist in treaty language prior to this has been created. I put no further value into the term, and as such, an innovation can be good, bad, sensible, or complete non-sense.
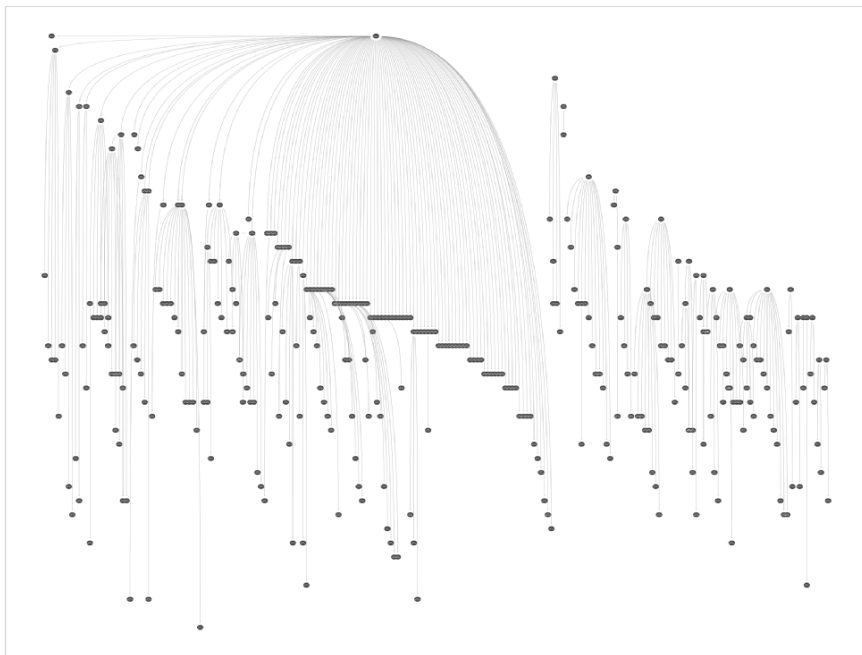
Figure 2. Illustration of how the language in the MFN clause from the Great Britain–Egypt 1975 treaty has spread. Each circle is a treaty, and the vertical axis represents time.

the impact of language itself. Finally, the scoring is bound by the completeness of the underlying dataset. If there are missing treaties, or the wording originates from a treaty outside of ITL, treaty points may be misattributed to the first identified author, rather than the true author of the clause language.

To accomplish this, a simplified scoring system, as illustrated in Fig. 3, was created. In this system, each State is rewarded one point for every treaty that has influenced another treaty. To score one point, the same variant of one of the 45 categories needs to be present in both treaties. A point is also awarded to the State if further treaties in the hierarchy below the initial treaty use the same variant in the same category. If a treaty affects another treaty through more than the category of clauses, the originating treaty will still only receive one point. As such, the maximum points a single treaty can generate for a State is equal to the number of treaties. However, as we wish to measure the influence each State has, the influence for each treaty is added together for the given originator.

The analysis of influence over time needs to be separated into two unique groups: direct and indirect influences. Direct influence is when a State that originated the clause is able to secure such language in a treaty to which they are a party. In the graph, this is referred to as Tier 1 influence. Indirect influence, on the other hand, is where a third-party State incorporates the language in treaties where the originator is not a party. Indirect influence is referred to in the graphs as Tiers 2–7, with the increasing tiers showing the degrees of separation of the clause from its original drafter and treaty.

While direct influence may be affected by a State's strength in a negotiation, as well as the quantity of treaties that this states has previously engaged in, indirect influence shows how a non-drafting party can disperse and carry forward language to others' treaties. As an example, a State that drafts unpopular language, but has a strong negotiating position, would find themselves
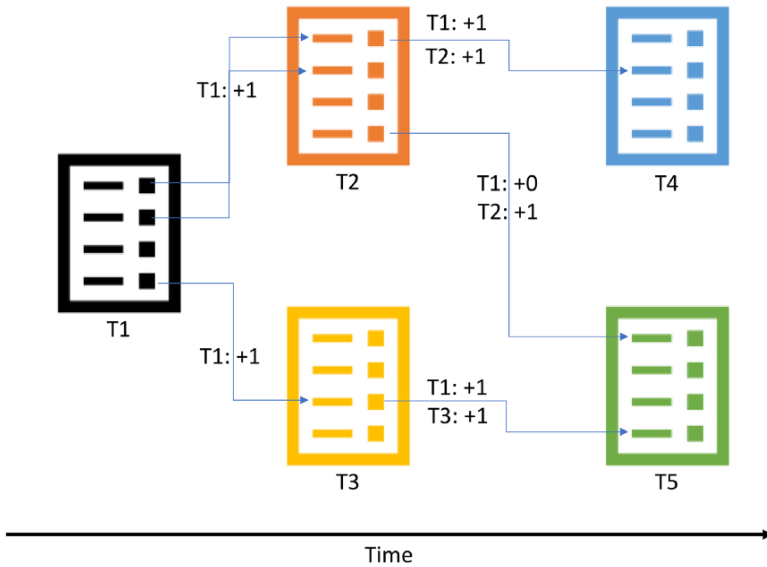
Figure 3. Illustration of how influence points are calculated. The boxes within the documents illustrate a given clause. The lines between clauses indicate that the clauses are of the same variant.

having strong direct influence, but scores lower on the indirect influence as other states would be hesitant to include the language in subsequent treaties. The inverse of this may also be true, where a State that has less negotiating power, but develop high-quality language, may find that their direct influence is limited, but their indirect influence score is higher.

As such, the State's influence is divided, analysed, and grouped by Tiers 1 to *n*. The first tier is as such where the State itself is a party to the treaty. The subsequent tiers are where the non-originator has taken the language into their own treaties with other parties. The largest number of tiers found for any actor is 7. For readability, when analysing and presenting the results, I divided the tiers up into two subgroups. The first (Tier 1) represents a State's direct influence on the treaties. The second (Tiers 2–7) shows how a State's language is spread outside its direct influence. This analysis is further divided up by decade and compounded by continent.

A comprehensive and detailed explanation, along with a description of the myriad of caveats, may be found in the 2023 article by this author.[61]

DRAFTERS OF NEW LANGUAGE

After filtering and quality assurance, a little over 8000 relations between different clauses were found across the dataset. After running the previously described algorithms on these relations, it is apparent that development and innovation follow clearly defined patterns. In the following section, I first, in the Introduction of new language section, present an analysis of when and where new language originates. This is followed by a discussion in the Variations on a regional level section of how varied treaty language is on a regional basis. Third, I present an in-depth study of the development of global influence at state (Global influence—states) and regional (Global Influence—region) levels. Finally, I present a commentary on what impact these results may have on the broader debates on IIL as a system.
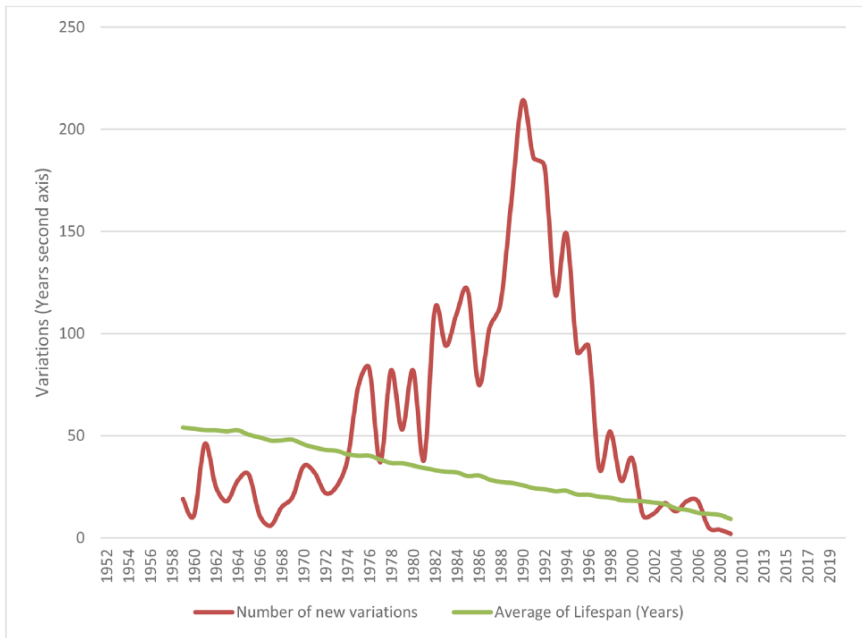
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[61] See n 57, above.

Figure 4. The number of new variations introduced per year, as well as the average lifespan of the variations from their date of introduction.

Introduction of new language

Within the 45 categories mapped, one can observe that all new variants were first crafted between 1958 and 2008. The variations on language generally have surprisingly long lifetimes, averaging at 89% remaining until 2020. The data show that once a variant of treaty language has occurred, it rarely falls completely out of use.

The number of innovations varies year-to-year, gradually increasing from the 1960s until the mid-1980s. The peak of introduction of new variants coincides with the start of the vast expansion of the international investment system in the 1990s and continuing until the middle of the decade. After the turn of the millennium, the introduction of new variants slows significantly and completely stops after 2009. Two caveats should be noted here: first, this does not mean that no new language is introduced, simply that the change in language is not significant enough, or that the spread of this language is wide enough, for the analytical system to distinguish it as a separate class. This caveat is relevant with regard to the 'new generation BITs' authored in the last 15 years; while they do add new language, it does not appear to spread significantly beyond the single treaty that the language originates from. Second, as the system is restricted to the 45 pre-defined categories, any new category types will not be considered sufficient enough to be picked up. Even with these caveats in mind, the results point towards a situation where it appears that the system as a whole appears largely settled and that the gravitation towards *status-qou* is sufficiently strong to significantly hinder new innovations or late arriving actors to gain significant influence.

In a parallel study, I have found that the number of variations and the rate of innovation vary significantly between the various legal categories.[62] In the study, I further find that the diffusion of clauses varies similarly across the different categories.[63] This provides some indications
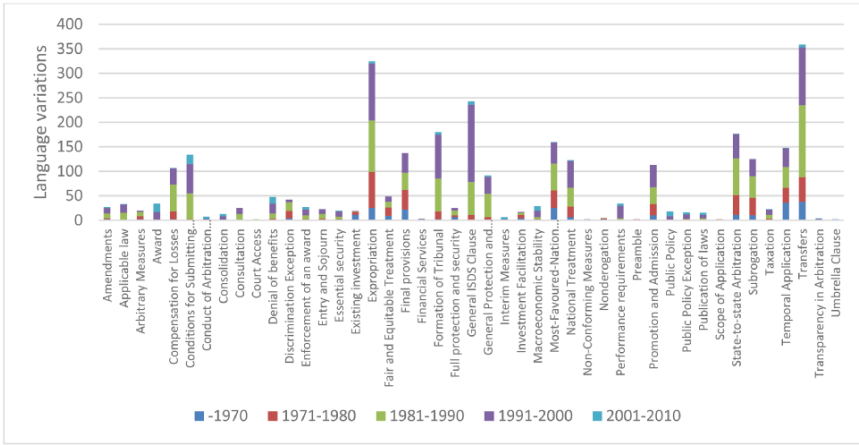
[62] ibid.
[63] ibid.

Figure 5. New variations of treaty clauses by decade.

that states either find greater room for policy space in some categories or that they find greater incentives to innovate in certain categories.[64] In Fig. 5, I illustrate how categories, such as expropriation, ISDS, and MFN see a significant amount of variance, while applicable law clauses and taxation are less varied.[65] Clauses that relate to material rights appear to be more varied than those that address procedural and formal matters. For most of the categories, I again observe that most of the new variants appear in the 80s and 90s.[66]

Figure 6 illustrates the development on a state level. Germany, Italy, and Switzerland provided new language during the 1950s and 1960s before other European financial and industrial powers such as Great Britain and France start introducing new language in the 1970s. The 1980s and onwards sees a greater global variety where Canada, Chile, China, Australia, and USA start contributing new language variants. As the millennium turns, most states slow down the creation of new language, bringing it to a halt by 2009. The most prolific inventor of new language at the end of the 2000s was the Belgium–Luxembourg Economic Union (BLEU) which has provided a total of 173 variants, despite its small size and limited economic output (at least compared to juggernauts, such as the USA and China).[67]

While a State's ability to spread preferred legal text into the investment system as described earlier may provide increased influence, authoring, and structuring, new variants may provide a State with additional definitional authority in future negotiations. As can be seen in Fig. 7, throughout the investment law system's history, European states were, by far, the most influential providers of new language. Currently, they have been the authors of almost half of the new textual variants. In the 1980s, Asian and African countries increased their shares significantly, while African and North-American states provided most of their new language in the 1990s.

Variations on a regional level

While looking at who creates new language in and of itself gives insight into the dynamics of treaty drafting, understanding how much a given State varies in their drafting helps us understand how states give and take during a negotiation. The data in Fig. 8 are calculated by counting

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[64] ibid.
[65] While preambles appear to be fairly unvaried, this is partly due to limited variation and partly that new variations appear not to spread. The algorithm is designed to not treat changes that do not spread as new variations.
[66] ibid.
[67] See Appendix I for an overview over the top 50 innovators.
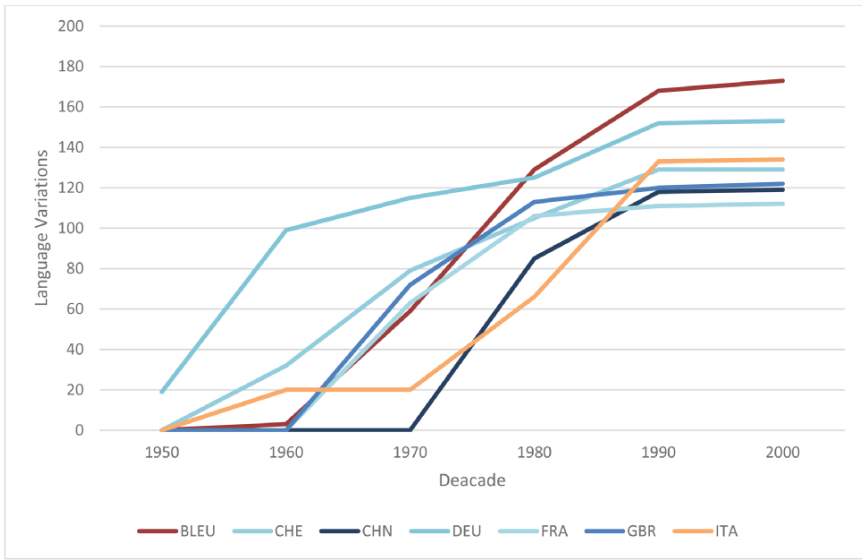
Figure 6. The cumulative number of new language variation across all categories by state. The graph shows the seven countries that have introduced the most cumulative variations.
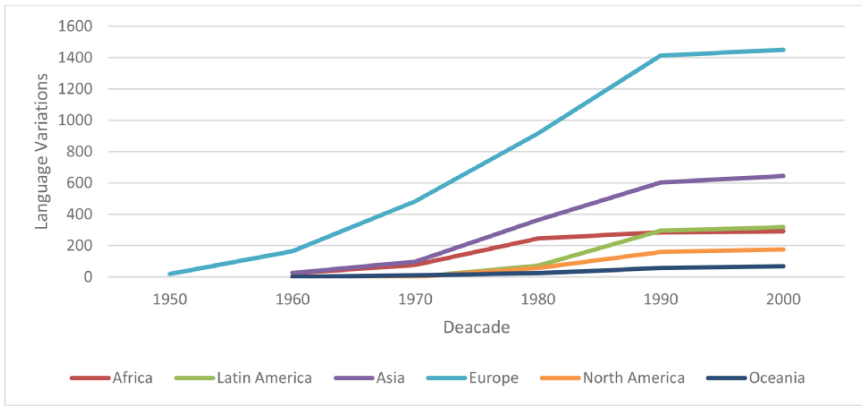

Figure 7. The cumulative number of new language variation across all categories by continent and decade.

how many variations each state employs in their treaties, divided by the number of treaties that they are a party to. The average across all states is subsequently calculated and presented in Fig. 9. The resulting data provide an insight into which category states on average vary their language the most. If a state has a sparse number of variations, this would indicate that they are successful at negotiating their preferences into a large variety of agreements. States that are less successful at negotiating, however, will have a higher number of variations as they will have to incorporate language from different parties. While the results analysed in the Global influence—states section provide absolute measures of influence, largely affected by the number of treaties a state is party to, the variation of clauses presenter here shows how states and regions are able to exert their influence within their given treaty networks.
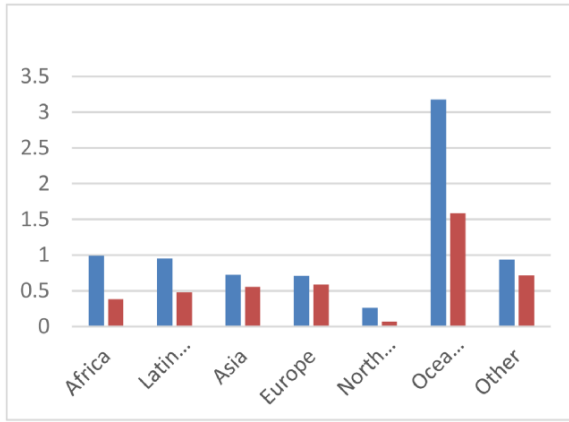
Figure 8. Variations on average per treaty/clause by continent. Others are treaty parties that are not states and have members from multiple continents.
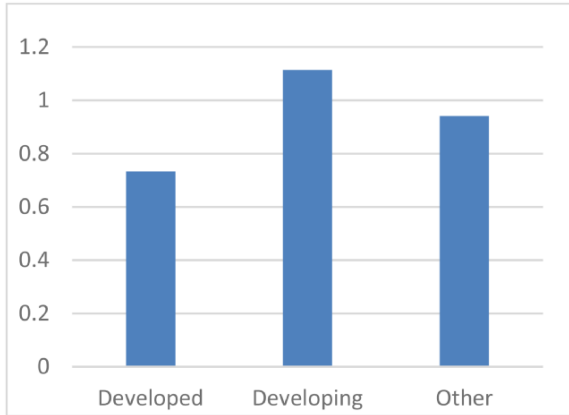

Figure 9. Variations on average per treaty/clause by developed/developing country status. Others are treaty parties that are not states and have members from multiple continents.

States in North America are by far the most consistent with 0.25 variations/clause/treaty on average. States geographically within Europe and Asia have around 0.7 variations/clause/treaty, while Africa and the Latin America have about 25% more with a little less than one variations/clause/treaty. Oceania forms a significant outlier with over three variations/clause/treaty.

The distinction between developing and developed countries shown in Fig. 9 is significant. Developed countries average a variation of 0.73 variations/clause/treaty, while developing countries have 1.1 variations/clause/treaty. The larger number of variations is an indication that they accept more language from their contract parties, rather than consistently use their own.

The graph in Fig. 10 shows the 10 states that see least variations and the 10 that experience the most. The average difference between the two groups is 10-fold. When the data are broken down into states, this aspect crystallizes. The states and organizations that have the lowest variations are states with a considerable number of treaties and solid political and economic influences. On the other hand, the states at the lower end of the spectrum are typically developing countries and capital importing states. This serves as an indication that the traditional western powerhouses
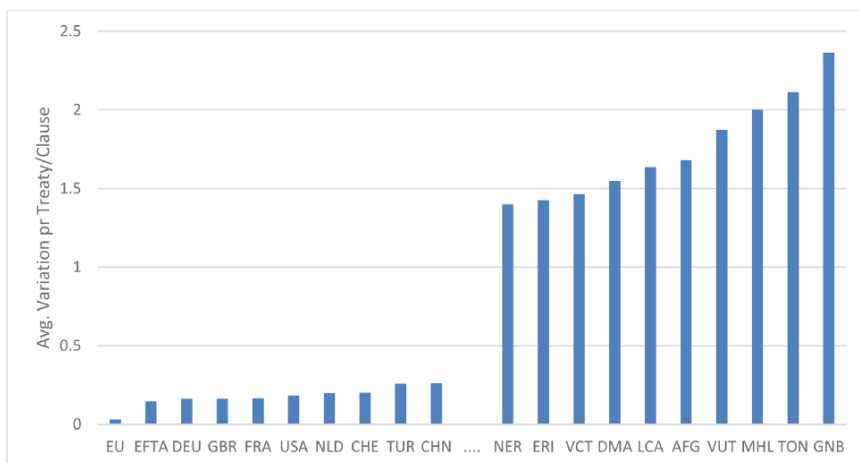
Figure 10. Top and bottom 10 by variations on average per treaty/clause.

and some newer economic powers are the rule-givers, while the less developed countries are the rule-takers.

Global influence—states

In this section, I analyse how the language of the system has developed and dispersed in greater detail. As described in the Methodology section, this is based on collating data from the 45 clause categories across the 3229 treaties. Through a detailed tracing of language, the general influence of individual state actors on treaty language is explored. By providing an analysis on both a state-by-state level, in this section, and on a regional level in the next, the study provides insight into local and global mechanisms of dispersion.

The top 20 countries, in terms of influence, represent well over half of the influence points (14,126/25,656 point direct and 7667/12,649 indirect) uncovered during the analysis.[68] The spread of influence that is illustrated in Figs 12 and 13 should be assessed together with the vast increase in treaties signed in the last decade of the 20th century (Fig. 11). This increase is paralleled in the spread of treaty language throughout the system. As previously established by Alschner, there is a significant reuse of language throughout the system's history.[69]

Out of the states analysed, China, with its 1287 influence points, is the most effective direct influencer. It also exhibits one of the steepest increases during the first decades of the 21st century. Following China, we find several Western European countries that have well-established track records within international investment. Switzerland (1127), Germany (1022), Czechia (835), the BLEU (826), and France (797) receive the following places. Further down the list, several Asian and Latin American countries are represented as well, although with a significantly less impact than the top tier.

If we expand the scope of the study to the indirect influence, the picture, however, changes drastically. Great Britain's influence, which holds ninth place on the direct influence score, is the most effective at getting its language into other states' treaties. Coming in 300 points above Switzerland and almost 500 points above China, it is far more effective at spreading its solution than the other states. In Figs 14 and 15, we can see an example of two such clauses originating

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[68] See Appendix II for a list of the 50 most influential states.
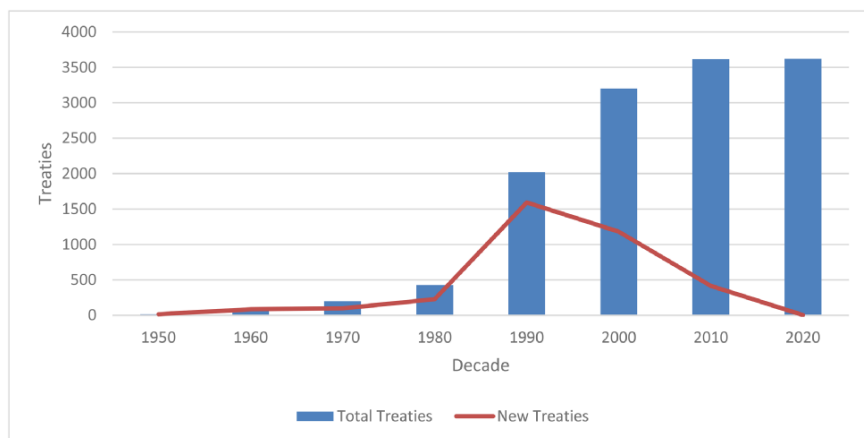[69] See n 28, above, locked in language.

Figure 11. The number of treaties/new treaties per year.

in UK treaties in the 80s and subsequently spreading to multiple other treaties throughout the coming decades. It is worth noting that the wording, while incurring minor changes, remains almost identical despite moving through multiple negotiations.

The effects of the long chains of linguistic copying illustrated in Figs 14 and 15 can be clearly seen in the illustrative graphs in Figs 16 and 17. Figure 16 shows how much influence each state has gained in each tier in absolute numbers, while Fig. 17 shows the ratio of each tier, where Tier 1 is direct influence and Tiers 2–6 are indirect. The effects from multiple instances of copying, two of which are shown in Figs 14 and 15, are clearly seen in how Great Britain's tier distribution materializes, with a significant influence stemming from Tiers 2, 3, and beyond (boxes 2, 3, and below from the top in Figs 14 and 15).

China's discrepancy here is illustrative of the difference in the mechanisms of influence. While China is highly successful in getting its language into agreements of which it is a party, this language does not appear similarly appealing for the other party to bring forward in their agreements with other states.

If we look closer at the distribution between the various tiers of influence for each state in Figs 16 and 17, the contrast between Great Britain and China gains further prominence. While 70% of China's influence is direct, Great Britain settles in at 40%. In the second tier, China exhibits only a little more than 20% of its influence, while Tiers 3 and 4 are just shy of 10% of its total influence on language. In contrast, Great Britain obtains 33% of influence score from the second tier, 20% from the third, and a little less than 10% from Tiers 4 to 6. In effect, this means that the indirect influence of Great Britain's language is significantly higher than that of China. That being said, neither China nor Great Britain is unique in this sense. China is well in line with countries like South Korea, France, and Germany. Similarly, the broad ability to spread language beyond their direct influence is mirrored by a varied set of states, such as Senegal, the USA, and Morocco. However, in terms of influence, the impact of these states on the system as a whole is far less impactful.

Global influence—regions

Raising the analysis from a state level to a regional level again illustrates the outsized influence of the European states on the investment system. In Figs 18 and 19, we can see that the European influence on the system is dominant throughout the decades, having as large an influence on
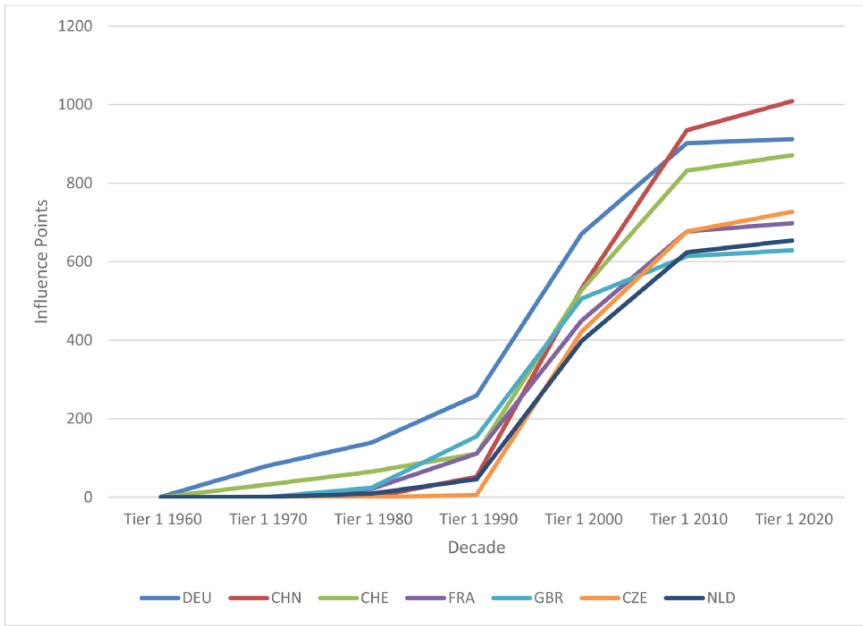
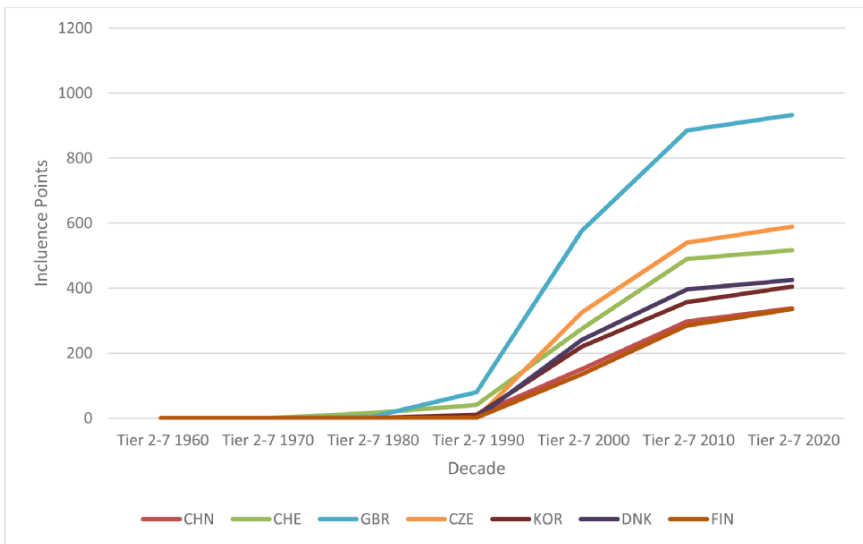**Figure 12.** Influence points of the top seven states for Tier 1 only.

Figure 13. Influence points of the top seven states for Tiers 2–7 combined.

language as all the other continents combined. While Asia and Latin America shows an increasing, but compared to Europe, low degree of influence, North America and Africa are lagging far behind.

The decades at either end of the millennium shift are where the direct influence appears to spread most aggressively, with indirect spread usually following a decade later. While the
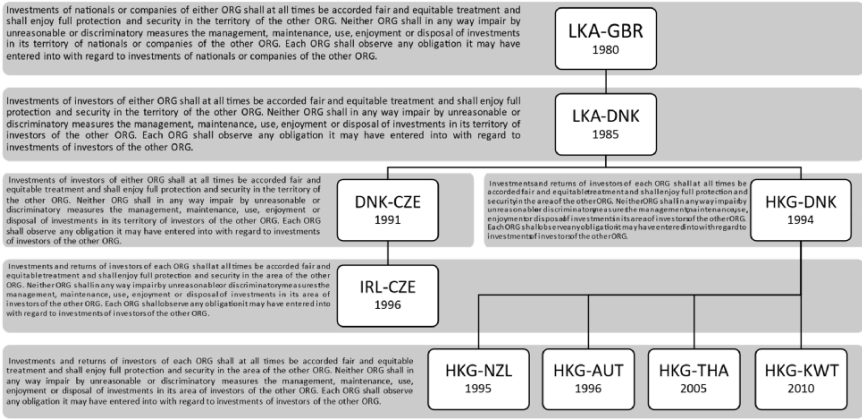
Figure 14. Example 1 of how a variant of the fair and equitable clause spreads over multiple treaties.

Figure 15. Example 2 of how a MFN clause spreads over multiple treaties.

direct influence appears by far the most effective way of spreading language, the proportionality between direct and indirect influences remains fairly even when contrasted with the large variations found in the state-by-state analysis.

Compared to the large state-by-state variations, the distribution of influence over the various tiers that can be seen in Fig. 20 is remarkably similar across continents. The direct influence accounts for between 60% and 65% of total influence, Tier 2 for about 20%, and Tiers 3–7 for about 10%. The relative similarity in distribution indicates that ability to spread language is conditional upon the region, but rather the individual states' ability to do so. However, this claim should be suffixed by an asterisk. It is clear from the data that the quantity of treaties and the ability to get language in the first tier are prerequisites for further spread.
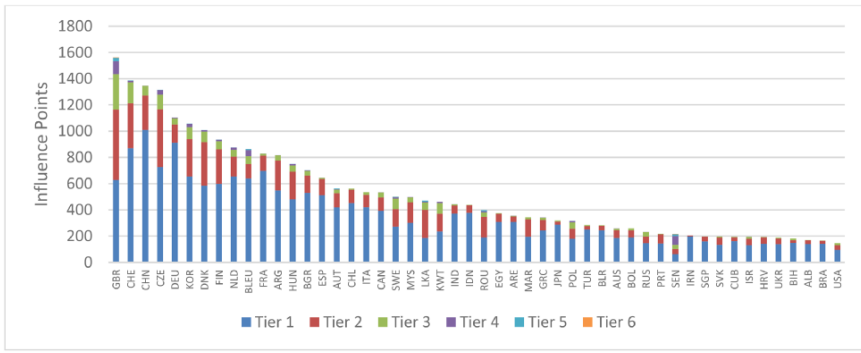
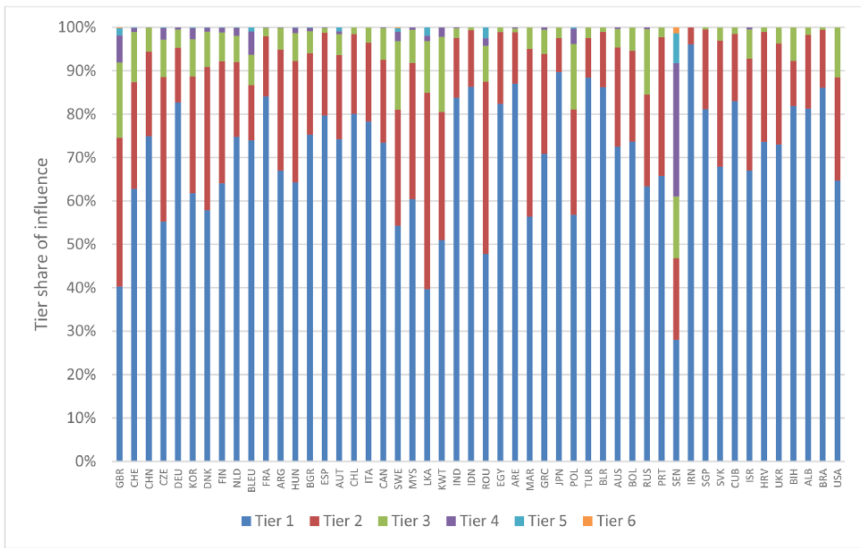**Figure 16.** The quantity of influence points for each tier and state.

Figure 17. The distribution of tiers for each state.

Fragmentation, convergence, and IIL as a system?

The data appear to inform the larger debates on fragmentation, convergence, and IIL as a system.[70] The intricate networks of linguistic reuse support the idea that treaties are not fully detached from one and another. Rather, they clearly appear to be part of much larger networks of rules—very much so a system. On the other hand, when looking at the rather large sets of variations identified by the empirical analysis, it would be a far stretch to address IIL as a singular system. The analysis conducted points rather towards a system of systems, where while many of its branches have similar origins, new trees appear to grow throughout its early history. With regard to the parallel question of whether the system is converging or diverging, the data offer some indications that both perhaps may be true until the turn of the century. While the data offer indications that a large number of treaties appear to contain the same language and as

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[70]   See e.g. n 16, above; see n 20, above; see n 16, above; Kate Miles, 'Investor-State Dispute Settlement: Conflict, Convergence, and Future Directions', in Marc Bungenberg and others (eds), *European Yearbook of International Economic Law 2016* (Springer International Publishing, Cham 2016), 273–308.
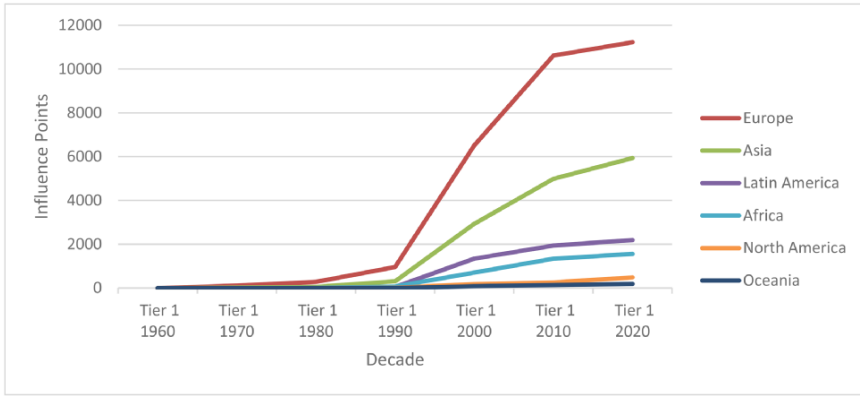
Figure 18. The Tier 1 influence over time. The graph shows the development in direct influence by decade.
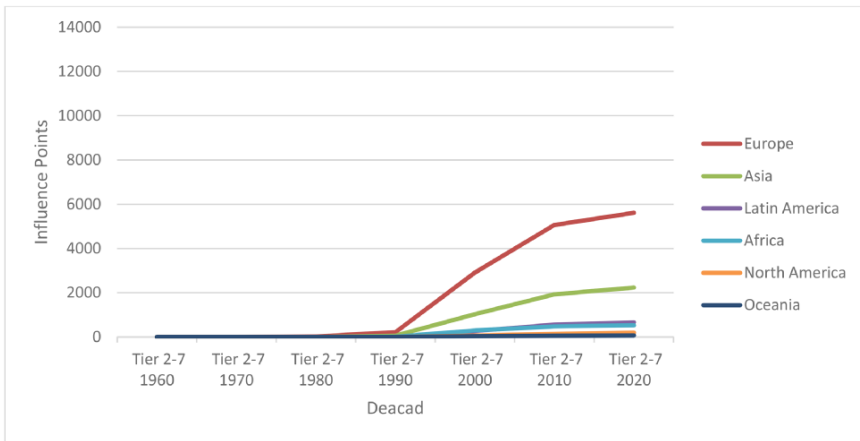

Figure 19. Tiers 2–7 influence over time. The graph shows the development in indirect influence by decade where the originating treaty party is not a party to subsequent treaties.

the system develops, the relative influence of key states increases, there are still a large number of new variations occurring, subsequently creating more varieties. As for the systems current status, I would argue that the data indicate that this issue, at least when it comes to treaties, is now moot.[71] While newer treaties do contain new diverging solutions, these do not appear to effectively spread, nor override the already established treaty provisions established in the 20th century. Rather than point towards divergence or convergence, this points towards a frozen system, at least when it comes to treaties. While it is outside the scope of this analysis, I have in a parallel study, however, found that if one limits the analysis to only litigated treaties or what one could consider the active part of IIL development appears to be converging.[72]

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[71] Looking beyond the treaties themselves, the actual practice of IIL is still in development, but primarily through practitioners rather than treaties. For further discussion on this matter, see Runar Hilleren Lie, 'Ghosts of the Past: The Dominance of Older Treaty Language in International Investment Arbitration' (in prep.).
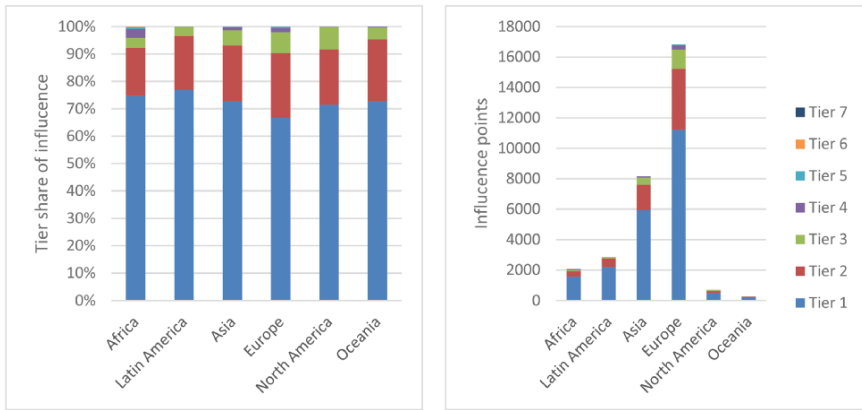
[72] ibid.

Figure 20. Left: graph indicating the relative distribution of tiers based on the continent. Right: absolute influence points.

CONCLUSION: GENERAL PATTERN

The results presented here point towards a single, but multifaceted, overarching observation. The universe of investment treaties is even less dynamic than previously thought. As we can see from the vast lifetime of language, once a new variation is created, it very rarely falls out of use; 72% of the variants have been used within the last 5 years, and 91% within the last 10 years. These results support findings by Waibel and Montal et al. on specific clauses and treaties that ITL clauses have great stickiness.[73] The longevity across all clause types shows a vast stickiness and general reuse of language throughout the system.[74]

This longevity is complemented by an apparent lack of new language. After reaching a peak in the 1990s, the rate of new language has plummeted. After 2009, the analysis system does not determine that there is a sufficient change in language to warrant creating new variants that spread to other treaties, which is rather surprising given the focus on new provisions on human rights, environment, and regulatory autonomy in treaties. This could indicate one of the three things. First, numerically, there is a significant reduction in the number of treaties after 2009, and alone, this reduction could lead to less new innovations. Second, states could either have determined that the current language is sufficient and that the system has reached stability. Third, that states are pursuing other avenues for advocating change rather than changing their treaties. Fourth, as the system is designed to trace influence, it will not create categories for single instances of new languages, and as such requires language to spread beyond a single treaty for it to be recognized as a new variation, states abilities to influence others with new language appear limited.

The system's reduced dynamism has two significant consequences: First, at its face, the system's instruments are remarkably similar; however, they are not without diversity. While there is a significant amount of similar language, some categories of clauses see hundreds of variants. There are both minor and major variations, yet hundreds of treaties share both language and structure.

The second consequence also serves as a possible explanation for why the system is less dynamic than one would expect. It appears from the data that the effects of path dependency

73 See n 48, above; See n 49, above, What states want.
74 See similarly Cree Jones and Weijia Rao, '(Un)stable BITs', The Yale Journal of International Law, 47 (2022), at 247.

impact the development and limits the effects and spread of new language variants.[75] In particular, the hegemony of Western Europe is apparent and there is a clear early mover advantage to obtaining language spread. European states—not the USA as assumed by Alvarez—are by far the most efficient at ensuring that their language is spread, both directly and indirectly, with Europe providing almost twice the language of the other continents combined. While this can partly be explained by the larger number of states, closer geography, and a larger number of treaty pairs within Europe compared to North America, countries such as the UK, Switzerland, and Germany individually each show seven to eight times the influence on language of the USA. Being early authors of treaties appears to have significant impacts on how future treaty language is spread. The early but lasting impacts of such language may serve as an explanation to the observations of Beechy and Crockett that West European states seem less inclined to make major changes to their model treaties compared to that of the USA and Canada.[76] While Asia and Latin America do increase their influence over time, there is still a significant disparity between the continents. This result is rather surprising considering the argumentation by Alvarez and the empirical findings of Alschner, which argue for the USA having a significant, and perhaps dominant, influence on the development of ITL.[77]

There are two plausible paths to explain the apparent diverging computational results between this article and Alschner's research. The first is the exact unit of measurement. While Alschner measures how the principal components of the treaties evolve,[78] in this article, I measure the spread of specific blocks of language at a fairly granular level. While Alschner's principal components express the general pattern and contents of a treaty, i.e. which types of clauses it promotes and omits, may be an innovation that the USA has effectively spread, these patterns would, in this analysis, only provide influence points if the language both originated in the USA and that the language subsequently was spread to further treaties. Agreements such as NAFTA and the US Model BIT have undoubtedly made an impact on both the literature and practice of IIA; however, the total linguistic impact appears to be limited.

The second line of explanation is related to volume versus impact. In this study, all treaties are weighed equally regardless of their age, financial impact, or the relative power of the parties. While an agreement, such as the NAFTA agreement, would be perceived to have a far greater weight than say an agreement between Egypt and Sweden, elements such as how early the treaty was signed, how many subsequent treaties use the original treaty's language, and how many treaties that the states in the relevant evolutionary branch subsequently make appear to have a deeper impact. To take a concrete example, Egypt–Sweden (1978) has around double the influence points of the NAFTA 1994 agreement, where most of the influence gains made by the prior are two and three degrees removed from the original treaty. The fact that the regions outside the USA have more states naturally leads to more treaty pairs, which in turn provides more opportunities for language to spread.

Impact can also be considered along the scale of how much these treaties impact litigation. In a forthcoming paper, I expand the methodology of this article to determine which root-clause drafting language is subject to litigation.[79] While this study provides further evidence of the hegemony of the early adopting capital-exporting states, it finds that the US treaty language, despite its relatively low spread in the system as a whole, is second only to UK drafting language in litigated cases.[80] As much of ITL is developed and interpreted from the case law, it is important

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75 See n 28, above, locked in language; See n 41, above, Investment Arbitration and State-Driven Reform.
76 See n 16, above, New Generation of BIT.
77 See n 30, above; See n 54, above.
78 See n 50, above, 34–37.
79 See n 72, above.
80 ibid.

to consider also whether influence from the general volume or litigated volume has a greater impact on the system.

As treaty drafters appear hesitant to introduce dramatic changes to treaties, this lack of textual dynamism may also mean that raw negotiating power has a limited effect. Through analysis of innovation and influence, it is clear that neither size nor pure negotiating power are guarantees for securing a state's language in the fabric of the system. China is an excellent example of this. While it is the most influential state in its direct negotiations, its ability to spread its ideas further is far more limited. In contrast, the BLEU and the UK serve as the opposite example. As both early drafters and innovators, their footprint is outsized compared to their direct influence. While their direct impacts are more limited, the introduction of new language and the ability to have others use them independent of their own negotiations ensure that their legal solutions to a significant extent become global standards.

If one is to draw a parallel to an evolutionary development, one could see the system as having a slow beginning, followed by an immense outburst of variation. While most of these variations survived in various degrees, some provisions particularly thrived and were reproduced repeatedly. As these variations have become dominant, the system has largely stabilized. Some variations still come and go, but attempts at new evolutions mostly stagnate as the established clauses are increasingly dominant and difficult to outcompete.

APPENDIX I

Table A1. List of top 50 innovators

State	Number of innovations 1950–2010	State	Number of innovations 1950–2010
BLEU	173	CZE	39
DEU	153	EGY	38
ITA	134	MYS	36
CHE	129	BGD	34
GBR	122	FIN	31
CHN	119	LKA	31
CAN	115	SEN	31
FRA	112	POL	30
AUT	72	COD	28
AUS	69	BOL	27
KOR	65	TUR	25
CHL	64	JPN	24
NLD	64	GAB	24
ARG	63	SGP	22
USA	61	GRC	20
KWT	59	PHL	20
MAR	52	MEX	19
BGR	52	RUS	19
DNK	49	BRA	18
ESP	46	CRI	18
IDN	46	IND	17
ROU	46	TUN	17
HUN	41	ARE	16
CZE	39	BDI	16

(continued)

Table A1. (Continued)

State	Number of innovations 1950–2010	State	Number of innovations 1950–2010
EGY	38	HTI	16
MYS	36	SWE	15

APPENDIX II

Table A2. List of top 50 influential states

Country code	Direct influence score	Indirect influence score	Total	Country code	Direct influence score	Indirect influence score	Total
GBR	629	933	1562	ROU	190	208	398
CHE	871	517	1388	EGY	309	66	375
CHN	1009	338	1347	ARE	309	46	355
CZE	727	589	1316	MAR	194	150	344
DEU	912	191	1103	GRC	243	100	343
KOR	654	405	1059	JPN	286	33	319
DNK	583	425	1008	POL	180	137	317
FIN	599	336	935	TUR	251	33	284
NLD	654	221	875	BLR	244	39	283
BLEU	639	225	864	AUS	187	71	258
FRA	698	132	830	BOL	190	68	258
ARG	547	270	817	RUS	147	85	232
HUN	482	268	750	PRT	144	75	219
BGR	530	174	704	SEN	61	157	218
ESP	513	131	644	IRN	197	8	205
AUT	418	145	563	SGP	159	37	196
CHL	450	112	562	SVK	133	63	196
ITA	419	116	535	CUB	161	33	194
CAN	392	142	534	ISR	130	64	194
SWE	272	229	501	HRV	142	51	193
MYS	301	197	498	UKR	138	51	189
LKA	187	284	471	BIH	149	33	182
KWT	235	226	461	ALB	139	32	171
IND	372	72	444	BRA	142	23	165
IDN	379	60	439	USA	95	52	147