Empirically Mapping Investment Arbitration Scholarship: Networks, Authorities, and the Research Front

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Abstract

Scholarship on international investment arbitration is plentiful. Despite it being a relatively young field, it would be difficult to name one in which more books and articles have been published in recent years. The field is a dynamic one, attracting a diverse range of authors; the stakes are high, the knowledge is limited: scholarly work is necessary and to be welcome. The amount of available literature, however, also provides us for an opportunity to study its relationship with the field it purports to describe: in a nutshell, we do not study investment arbitration scholarship because we are naively surprised that it exists, or that there is so much of it. We know that there must be good reasons for it to do so, and to do so to this extent. It is precisely for these very good reasons that we can resolutely argue that investment arbitration scholarship is worth studying, and that studying investment arbitration scholarship can bring us a step closer to a better understanding of investment arbitration. Accordingly, this chapter seeks to provide a large-scale analysis of investment arbitration scholarship. By combining theoretical insights and big data empirical analysis, we seek to map the field, its actors, and, its dynamics, with a view to revealing latent patterns through citations, topics, and publication dynamics, but also through tribunals" own use of literature.

Keywords

International arbitration; legal scholarship; legal reasoning; literature; scientometrics.

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1 Introduction

Let's cut to the chase. There is *a lot* of scholarship on international investment arbitration. Despite it being a relatively recent field (but then, for how long? And what was a 'field" again? We will come back to it), it would be difficult to name one in which more books and articles have been published in recent years.

True, some may say at this point, the books are many—but so are the cases, the people involved in it, the unresolved problems. The field is a dynamic one, attracting a diverse range of authors; the stakes are high, the knowledge is limited: scholarly work is necessary and to be welcome. And they would be right. It would be hypocritical to contend otherwise in a piece that is, after all, about investment arbitration—be it by way of its scholarship. In a nutshell, we do not study investment arbitration scholarship because we are naively surprised that it exists, or that there is so much of it. We know that there must be good reasons for it to do so, and to do so to this extent. It is *precisely* for these very good reasons that we can resolutely argue that investment arbitration scholarship is worth studying, and that studying investment arbitration scholarship can bring us a step closer to a better understanding of investment arbitration.

This chapter seeks to provide a large-scale analysis of investment arbitration scholarship. By combining theoretical insights and big data empirical analysis, we seek to map the field, its actors, and, its dynamics, with a view to revealing latent patterns through citations, topics, and publication dynamics, but also through tribunals' own use of literature. It moves in six parts: Part I refines the case for mapping Investment Arbitration Scholarship; Part II sets out our methodology; Part III looks at the citation patterns between scholarly authorities; Part IV considers the citation of scholars by investment tribunals; Part V discusses the findings in context.

2 The case for mapping international investment arbitration scholarship

2.1 Haven't we been here before?

Why examine scholarship? While the question, taken generally, has given rise to an entire scientific field, it is almost never addressed by scholars writing on legal scholarship. The reason, we suspect, is quite simple: we are used to legal scholarship being central to our professional or academic lives. The assumption is that posing the question would be the equivalent of asking a person why they are breathing air. We care about legal scholarship—or, at the very least, we know that we have to deal with it in some manner, as either authors, audience, or, as it normally happens, both.

Authorship and audience make legal scholarship interesting: as celebrated Harvard legal scholar Mark Tushnet observed, it is difficult to think of a field with less "intellectual marginality'.[1] Regardless of the amount of scholarship we consume within academia, it is difficult to imagine a comparable demand for it outside of it,[2] even where questions addressed by academics are to be resolved in a court, or by policy makers.

To be sure, much of this has to do with the growing specialization of legal expertise, but also with the nature of the profession of the academic, who is now more worried about certain metrics than others: as one commentator has observed in relation to the American academic market, it would not be an overstatement to claim that one's professional trajectory is defined in no small part by one's ability to impress second-year law students—but the reflection might not be too different when other types of editors are considered—focused on maximising the competitiveness of the periodical they edit by attracting citations and debate around its contents.[3] Thus, it would be easy to denounce this form of scholarly output as self-serving and meaningless, with literature forming the basis of academic dialogue, but not of much else. One metric that has been commonly invoked to demonstrate that this is, in fact, the case is the fact that, even where scholarship is traditionally cited by courts, citation is on a downward trend.[4]

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[1] With reference to American scholarship see Mark Tushnet, 'Legal Scholarship: Its Causes and Cure Symposium on Legal Scholarship: Its Nature and Purposes' [1980] Yale Law Journal 1205, 1205 ('I cannot imagine, for example, an intellectual history of contemporary America in which legal thought would play an important part… [t...]he intellectual marginality of legal scholarship is all the more striking in light of 7 the immense role that law plays in American society').

[2] This is not to say that the demand for legal scholarship is low: as in a number of academic fields, it is not, and the business is profitable specifically because 'demand has the elasticity of cast iron'. See 'EJIL: Talk! – What a Journal Makes: As We Say Goodbye to the European Law Journal' <https://www.ejiltalk.org/what-a-journal-makes-as-we-say-goodbye-to-the-european-law-journal/> accessed 6 February 2020.

[3] Jeffrey L Harrison and Amy R Mashburn, 'Citations, Justifications, and the Troubled State of Legal Scholarship: An Empirical Study' (2015) 3 Tex. A&M L. Rev. 45, 46–47.

[4] There is substantial literature on this topic, especially in American law. See, *inter alia*, Richard Kopf, 'Do Judges Read the *Review*? A Citation-Counting Study of the *Nebraska Law Review* and the Nebraska Supreme Court, 1972–1996' (1997) 76 Nebraska Law Review <https://digitalcommons.unl.edu/nlr/vol76/iss4/4>; David L Schwartz and Lee Petherbridge, 'The Use of Legal Scholarship by the Federal Courts of Appeals: An Empirical Study' [2010] Cornell Law Review 1345; David L Schwartz and Lee Petherbridge, 'Legal Scholarship and the United States Court of Appeals for the Federal Circuit: An Empirical Study of a National Circuit' [2011] Berkeley Technology Law Journal 1561; Michelle M Harner and Jason A Cantone, 'Is Legal Scholarship out of

Undeniably, depending on the relevant legal tradition, scholarly pieces may or may not be cited by judges and other important actors for largely unrelated reasons, ranging from drafting conventions to other motives. But the question that this lack of reliance on scholarship beyond legal academia raises remains the same. In fact, the question becomes even more pressing: if scholarship is invisible outside of scholarly circles, how do we measure its real-world impact? Note that this impact need not be conceived too simplistically: we know all too well that there is no single hard boundary between the communities of scholars and practitioners in more or less any areas of law.

As with most other complicated problems, there is more: when discussing the invisibility of scholarship beyond academia, most critics seem to assume that the impact of scholarship *within* academia must be absolutely clear and in need of no further explanations. Naturally, this is not the case. It is certainly possible to be aware of some important scholarly output and single out the paradigm-changing ones just by keeping up to date with journal symposia, learned conferences, and the blogosphere. Yet, one cannot escape the impression that approaches of this kind might rely on the force of anecdotes to an excessive degree. Hence the need to draw a more accurate picture.

2.2 Actors, paradigms, identities

Naturally, this is not the first time that the role of scholarship in law has come under scrutiny, although the issue has not attracted a great deal of attention in the context of investment arbitration.[5] It is thus possible to draw some useful parallels.

There is some consensus on the idea that there is an inherent hybrid quality to international investment law and arbitration as a field. Thus, many have compared it to other established areas of specialisation with a view to identifying the best comparator and borrow the soundest analogies. We do not seek here to make a meaningful contribution to the debate, which, in any event, has been tackled far more thoroughly elsewhere.[6] Rather, we concur with the idea that investment arbitration is a hybrid field, a conceptual borderland, and we find it plausible to assume that its scholarship might reflect the intellectual legacies of that of other fields. We consider here the examples of public international law and arbitration scholarship, which, we posit, might be those with which the producers and consumers of Investment Arbitration Scholarship are most familiar.

2.2.1 Public international law scholarship

One key characteristic of international investment arbitration is that it has historically revolved around international law and international lawyers—as in lawyers that are

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Touch - An Empirical Analysis of the Use of Scholarship in Business Law Cases' [2011] University of Miami Business Law Review 1.

[5] For an exception see Stephan W Schill, 'W(h)Ither Fragmentation? On the Literature and Sociology of International Investment Law' (2011) 22 European Journal of International Law 875.

[6] See *inter alia* Stephan W Schill (ed), *International Investment Law and Comparative Public Law* (Oxford University Press 2010); Anthea Roberts, 'Clash of Paradigms: Actors and Analogies Shaping the Investment Treaty System' (2013) 107 The American Journal of International Law 45; Eric De Brabandere, *Investment Treaty Arbitration as Public International Law* (Cambridge University Press 2014); Valentina Vadi, *Analogies in International Investment Law and Arbitration* (Cambridge University Press 2016); José E Alvarez, '"Beware: Boundary Crossings" – A Critical Appraisal of Public Law Approaches to International Investment Law' (2016) 17 The Journal of World Investment & Trade 171.

experienced in public international law— to a far larger extent than other forms of arbitrations. Investment tribunals apply what is essentially public international law—treaty, custom, general principles.[7] One may note, in addition, that the communities of public international law and investment arbitration overlap to a significant degree. Finally, and of more immediate relevance for our present purposes, international law periodicals are replete with discussions of investment arbitration issues, just as decisions of investment tribunals cite a sizable number of public international law literature—and, of course, cases.[8]

International lawyers have a soft spot for legal scholarship. This is not—or, at least, not only—vain self-referentiality, but rather the result of what amounts to a formal recognition of the role of scientific writing in the legal system. According to Article 38(1)(d) of the Statute of the International Court of Justice (ICJ), the "teachings of the most highly qualified publicists of the various nations" amount to "subsidiary means for the determination of rules of law', just like judicial decisions.[9] As the ICJ Statute is generally seen as the most authoritative statement of the sources of international law, writers can relish in the formal sanction of their role as capable of influencing or determining—if only in the context of law-ascertaining—what international law is.[10]

From a historical perspective, one may also observe that the role of scholars was ostensibly even greater before the "event" of Article 38.[11] The provision ostensibly built on previous arbitral practice,[12] which nevertheless is, to put it bluntly, not nearly enough to assess the significance of scholarly impact on the development of international law in an era of limited judicialization.[13] As Oppenheim could write in 1908, "The writers on international law, and in especial the authors of treatises, have in a sense to take the place of the judges... It is for this reason that text-books of

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[7] Brabandere (n 8).

[8] Ole Kristian Fauchald, 'The Legal Reasoning of ICSID Tribunals – An Empirical Analysis' (2008) 19 European Journal of International Law 301; Alain Pellet, 'The Case Law of the ICJ in Investment Arbitration' (2013) 28 ICSID review 223; Stephan W Schill and Katrine R Tvede, 'Mainstreaming Investment Treaty Jurisprudence' (2015) 14 The Law & Practice of International Courts and Tribunals 94; Damien Charlotin, 'The Place of Investment Awards and WTO Decisions in International Law: A Citation Analysis' (2017) 20 Journal of International Economic Law 279; Niccolo Ridi, 'Approaches to External Precedent: Invocation of International Decisions in Investment Arbitration and WTO Dispute Settlement', *Adjudicating International Trade and Investment Disputes: Between Isolation and Interaction* (Cambridge University Press 2018).

[9] ICJ Statute, Article 38(1)(d)

[10] For one such view expressed in a book which is very much on law-ascertainment, see Jean d'Aspremont, *Formalism and the Sources of International Law: A Theory of the Ascertainment of Legal Rules* (OUP Oxford 2013) 209.

[11] For the notion of Article 38 as an important 'event' see Thomas Skouteris, 'The Force of a Doctrine Art. 38 of the PCIJ Statute and the Sources of International Law' in Fleur Johns, Richard Joyce and Sundhya Pahuja (eds), *Events: The Force of International Law* (Routledge-Cavendish 2010).

[12] League of Nations. Advisory Committee of Jurists, *Procès-Verbaux of the Proceedings of the Committee, June 16th-July 24th, 1920, with Annexes* (The Hague, Van Langenhuysen 1920) <http://archive.org/details/procsverbauxof00leaguoft> accessed 19 January 2016; For an understanding of Article 38 as consolidating previous arbitral practice see Malgosia Fitzmaurice, 'History of Article 38 of the Statute of the International Court of Justice' (Social Science Research Network 2016) SSRN Scholarly Paper ID 2774354 <http://papers.ssrn.com/abstract=2774354> accessed 10 May 2016.

[13] For some early reflections on judicialisation see John Bassett Moore, 'General Introduction General Introduction' (1929) 1 International Adjudications: Ancient and Modern History and Documents vii.

international law have so much more importance for the application of the law than text-books of other branches of the law'.[14]

While, even then, approaches to scholarly writing were not all that uncritical,[15] we generally assume that our era is a different one: for starters, there are courts, judges, arbitrators—in other words, law-applying authorities which occupy much of the space once reserved to the legal adviser and the diplomat, albeit in an uneven fashion.[16] From a result-oriented perspective, their output might be more important of that of scholars, all the more so when their degree of systemic embeddedness in a given regime is higher.[17] As Schwarzenberger observed, "[t]here is a world of difference between practicing shooting with dummy ammunition on a wooden target and firing in earnest with live ammunition on a living target'.[18]

Indeed, if one looks at the citations patterns of international courts and tribunals, it will be immediately apparent that "teachings" are not cited nearly as much as judicial decisions,[19] and that their relatively scarce relevance decreases as soon as patterns of referring to previous decisions emerge.[20] In other words, international courts prefer some "subsidiary means" over other ones, though the justifications may be quite variegated.[21] Domestic courts may have different approaches, but they, too, vary in their drafting conventions.[22] Yet, this is not to say that doctrine is meaningless: first, not all international adjudicators are so careful not to cite publicists; second, even where doctrine is not directly referred to by the majority, it may have prompted reflection on how to resolve a specific legal question or another: evidence of this trend is easy to

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[14] Lassa Oppenheim, 'The Science of International Law: Its Task and Method' [1908] American Journal of International Law 313, 315.

[15] Consider, for example, this passage from Pasquale Fiore's treatise, which predates Oppenheim's by about forty years (our translation): 'We observe, however, that the authority of publicists must be employed with a grain of salt, without ascribing to their opinion such weight capable of displacing the principles of reason'. See Pasquale Fiore, *Nuovo dritto internazionale pubblico : secondo i bisogni della civiltà moderna* (Milano : Casa Editrice e Tipografia degli Autori-Editori 1865) 42.

[16] See also Benedict Kingsbury, 'International Courts: Uneven Judicialisation in Global Order' in James Crawford, Martti Koskenniemi and Surabhi Ranganathan (eds), *The Cambridge Companion to International Law* (Cambridge University Press 2012).

[17] Karen J Alter, 'The Multiple Roles of International Courts and Tribunals: Enforcement, Dispute Settlement, Constitutional and Administrative Review' (Social Science Research Network 2012) SSRN Scholarly Paper ID 2114310 <https://papers.ssrn.com/abstract=2114310> accessed 26 February 2017.

[18] Georg Schwarzenberger, 'The Inductive Approach to International Law' (1947) 60 Harvard Law Review 539, 553–4.

[19] See generally Michael Peil, 'Scholarly Writings as a Source of Law: A Survey of the Use of Doctrine by the International Court of Justice' (2012) 1 Cambridge Journal of International and Comparative Law 136.

[20] Sondre T Helmersen, 'The Use of Scholarship by the WTO Appellate Body' (2016) 7 Goettingen J. Int'l L. 309, 323; Lassa Oppenheim, *Oppenheim's International Law: Peace* (Longman 1992) 42; Peil (n 21) 144.

[21] RY Jennings, 'The Judiciary, International and National, and the Development of International Law' (1996) 45 The International and Comparative Law Quarterly 1, 9 (maintaining that '[t]he main reason for this convention is, one suspects, not so much based upon any principle concerning a source of law but, rather, to avoid invidious distinctions between publicists cited and publicists not cited').

[22] Consider for example the reliance on scholars in early American cases: *The Paquete Habana* 175 US 677, 700 (1900). Consider also *The Freedom And Justice Party & Ors, R (On the Application Of) v Secretary of State for Foreign and Commonwealth Affairs & Anor [2016] EWHC 2010 (Admin)* (EWHC (Admin)).

observe in the individual opinions of many adjudicators, including the ICJ;[23] for this reason, and finally, it is quite possible that widespread academic support or criticism of a specific proposition will affect the way it is relied on, even if its discussion does not make the cut in the final decision.[24]

More fundamentally, the international legal scholar does not live for citation only. Within the international legal system, she acts the important ordering figure of the "grammarian'. This intuition, first proposed by Pierre-Marie Dupuy, and further elaborated by Martti Koskenniemi,[25] has been more recently considered by Gleider Hernández.[26] The main thrust of the idea is that international lawyers exercise an important role in defining the structure and systematization of the grammar shared by a community—of language, metaphorically; of practice, in actuality. It may be true, as Hernández contends, that scholars may bring their contribution in the task of *distinction* between law and non-law—almost as if they were the punctilious "purifiers" of Borges" *Library of Babel*, parsing the meaningful content from the inevitable gibberish.[27] More fundamentally, however, their role is role is normative because "a grammarian shapes the formulation of arguments by other actors, the categories of acts, utterances and practices that will be deemed relevant and indeed contributes to the elaboration of the language'.[28]

Coming full circle, international legal scholars are also deeply embedded in the community of international lawyers. They—often—wear multiple hats and perform different functions. Borrowing, again, the words of Gleider Hernández, "the category of international legal scholar is far from hermetic'.[29]

2.2.2 Arbitration literature

Arbitration literature may serve as another paradigm. No formal recognition as "subsidiary means" is offered in this area, unless a specific domestic law—or international law, if relevant—provides otherwise. Rather, the importance of scholarship in the field of arbitration (and, by "arbitration', we mainly refer to the general category of international commercial arbitration) has perhaps less to do with

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[23] Sondre Torp Helmersen, 'Finding "the Most Highly Qualified Publicists": Lessons from the International Court of Justice' (2019) 30 European Journal of International Law 509.

[24] For a case in which it did, see *Waguih Elie George Siag & Clorinda Vecchi v. Arab Republic of Egypt*, ICSID Case No. ARB/05/15, Award, 1 June 2009, paras 498-499 ('The Loewen decision has been the subject of intense scrutiny and criticism by international law scholars and investment arbitration practitioners… Commentators have also stigmatised the Tribunal's application of a rule developed in one particular contex… Finally, academics and practitioners have questioned the relevance of the *Loewen* Tribunal's conclusions'.).

[25] Martti Koskenniemi, *From Apology to Utopia: The Structure of International Legal Argument* (Cambridge University Press 2006) 563 ff.

[26] Gleider Hernández, 'The Responsibility of the International Legal Academic: Situating the Grammarian Within the "Invisible College"' in Jean dAspremont and others (eds), *International Law as a Profession* (Cambridge University Press 2017).

[27] Jorge Luis Borges, *The Library of Babel* (David R Godine 2000).

[28] Hernández (n 28) 162; The author persuasively refers to Pierre Bourdieu, 'Force of Law: Toward a Sociology of the Juridical Field, The' (1986) 38 Hastings Law Journal 805, 824 (arguing that academics 'carry out the function of assimilation necessary to ensure the coherence and the permanence of a systematic set of principles and rules').

[29] Hernández (n 28) 166.

the paradigm of sources and more with that of intelligent design—as a construct, of course, not as an argument.

It would be pointless for the reader and taxing for the authors to engage in a full-length discussion of the usual arguments on the "creation" of arbitration law as a field, as a specialization, as a legal system as whole. Nor do we wish to engage in a discussion about the borders between international arbitration scholarship and scholarship on international arbitration,[30] however interesting that might be. We will restrict ourselves to relaying the *vulgata*: over the last four decades or so, international arbitration has grown increasingly international, and its scholarship had largely celebrated its progressive detachment from the bounds of national law.[31]

To be sure, one of the very few empirical analyses conducted on the point paints a mixed picture: as Helmersen explains, in the 203 ICC awards published in the Yearbook of Commercial Arbitration between 1976 and 2014, there have been 719 references to scholarship, averaging 3.5 per award—though, in practice, 51% of the awards contain no references.[32] Moreover, the approach appears to be relatively conservative, with little reliance being placed on what Helmersen terms "delocalisation scholarship'.[33]

Beyond the necessary caveats about the fact that many awards remain unpublished, and with their potential use of scholarship well shrouded in mystery, citations in arbitral decisions might not necessarily be the best metric to determine influence. Rather, what we wish to highlight is that it any account of the creation of international arbitration as a field seemingly relies on a narrative that sees scholarly endeavours as laying the groundwork for it. The foundational myth of the scholar-utopian engaged in a struggle for the liberation of arbitration from the bounds of state law is a familiar trope,[34] a constant feature in the treatises of the most learned and accomplished authors. For all of the rediscovery of individual influence in the field of public international law, it is arguable that, their respective fields being the frame of reference, the influence of Bruno Oppetit[35] or René David is quantitatively and qualitatively greater than that of Lassa

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[30] The obvious example is Yves Dezalay and Bryant G Garth, *Dealing in Virtue: International Commercial Arbitration and the Construction of a Transnational Legal Order* (University of Chicago Press 1998); But one wonders whether the same could be said about other, more 'juridical' works. Consider, for example, Emmanuel Gaillard, *Legal Theory of International Arbitration* (Martinus Nijhoff Publishers 2010).

[31] The usual examples will suffice Jan Paulsson, 'Arbitration Unbound: Award Detached from the Law of Its Country of Origin' (1981) 30 International & Comparative Law Quarterly 358; Jan Paulsson, 'Delocalisation of International Commercial Arbitration: When and Why It Matters' (1983) 32 International & Comparative Law Quarterly 53; Hans Smit, 'A-National Arbitration' (1988) 63 Tulane Law Review 629; David D Caron, 'The Nature of the Iran-United States Claims Tribunal and the Evolving Structure of International Dispute Resolution' (1990) 84 American Journal of International Law 104.

[32] Sondre Torp Helmersen, '"Delocalisation" Scholarship in ICC Arbitral Awards' (2017) 62 Scandinavian Studies in Law 261.

[33] ibid.

[34] We point to the excellent discussion in Ralf Michaels, 'Dreaming Law without a State: Scholarship on Autonomous International Arbitration as Utopian Literature' (2013) 1 London Review of International Law 35; For examples of the oneiric language discussed by Michaels see Gabrielle Kaufmann-Kohler, 'Arbitral Precedent Dream, Necessity or Excuse?' (2007) 23 Arbitration International 357; Julian DM Lew, 'Achieving the Dream: Autonomous Arbitration' (2006) 22 Arbitration International 179.

[35] See in particular Bruno Oppetit, 'Le droit international privé, droit savant' [1993] Recueil des cours; Bruno Oppetit, *Théorie de l'arbitrage* (1re éd., Presses universitaires de France 1998).

Oppenheim or Gerald Fitzmaurice. More than that, scholarly pursuit remains encouraged and dignified in modern treatises. Thus, for example, Paulsson devotes an entire section in his *The Idea of Arbitration* to the prediction of "a resurgent influence of legal scholarship',[36] and in the context of a process of increased legitimacy for arbitration itself no less.[37]

When authors of this calibre, influential and accomplished as both scholars and practitioners, put forward similar views, it is difficult to remain indifferent. Yet, we might wonder about the types of incentives behind their writing, but also about their audience: if it is true that "[t]he existing world of international commercial arbitration already belongs to a small, mostly closed, cohort of scholars and practitioners… hard to enter, its ideology […] immune to critique',[38] what is the purpose of an effort to persuade? We might also wonder about their thematic influence: do younger or less accomplished authors write about the same things? And who reads and cite them?

2.2.3 Investment arbitration scholarship: authors, audience, end-users

The two models discussed above are of some relevance for our current analysis. It is sometimes said that investment arbitration sits at the intersection of these two fields. Investment law, as a whole, is one of the key examples of the "[e]xpanding domain of international law'.[39] Different authors, as discussed, propose that the field should find its ideal comparator in either the commercial paradigm, or public law and human rights.[40] Different backgrounds may make for different approaches to important issues, some of systemic relevance,[41] and different sensitivities arising from prior experiences have been taken into account by relevant stakeholders as relevant features of the system.[42]

Yet, it is arguable that the peculiar relationship entertained by investment arbitration and its literature might be best explained by reference to the field's social makeup. Figure 1 provides an even clearer illustration of the current situation by using social network analysis[43] to draw a full network of arbitral appointments in investment tribunals in all of the known investment treaty disputes as to October 2019.[44] The

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[36] Jan Paulsson, *The Idea of Arbitration* (OUP Oxford 2013) 256.
[37] ibid.
[38] Michaels (n 36) 62.
[39] Alex Mills, The Privatisation of Private (and) International Law, Inaugural Lecture, University College London, 6 February 2020, Current Legal Problems Lecture Series (still unpublished).
[40] For some discussion of the point see Schill, *International Investment Law and Comparative Public Law* (n 8); Roberts (n 8); Vadi (n 8).
[41] The usual example is the conflicting approaches to the role of the state Thomas W Wälde, 'Procedural Challenges in Investment Arbitration under the Shadow of the Dual Role of the State: Asymmetries and Tribunals' Duty to Ensure, pro-Actively, the Equality of Arms' (2010) 26 Arbitration International 3.
[42] David Gaukrodger, Appointing Authorities and the Selection of Arbitrators in Investor-State Dispute Settlement: An Overview, OECD Consultation Paper, March 2018.
[43] Similar approaches have been applied to the sociology of investment arbitration by 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.
[44] Analysis by Niccolò Ridi, based on data by Daniel Behn, Malcolm Langford, Ole Kristian Fauchald, Runar Lie, Maxim Usynin, Taylor St John, Laura Letourneau-Tremblay, Tarald Berge and Tori Loven Kirkebø, PITAD Investment Law and Arbitration Database: Version 1.0, Pluricourts Centre of Excellence, University of Oslo (31 January 2019). The network analysis has been carried out with the

portion of the graph included here, which shows the core of the arbitration network, provides a representative picture of the social aspect of what has been called the "marriage of public international law and international commercial arbitration'.[45] The network algorithm employed here shifts central players (larger) towards the centre; colours represent computationally-identified clusters,[46] drawing attention to actors who are more connected among each other than to the rest of the network; finally, the "edges'—the ties connecting the different "nodes" of the networks—are "weighed', and thus represented as proportionally thicker depending on how often two arbitrators have been appointed together.

Complex network measurements, which have been successfully employed elsewhere,[47] are not necessary for our present purposes. The graph below highlights at least two prominent features of the arbitration community:[48] the comparatively small number of influent, repeat players, and the strong connections linking some of them. Hence our question: how *cannot* this peculiar social structure influence investment arbitration as a scholarly field?

Gephi software. See Mathieu Bastian and others, 'Gephi: An Open Source Software for Exploring and Manipulating Networks.' (2009) 8 ICWSM 361.

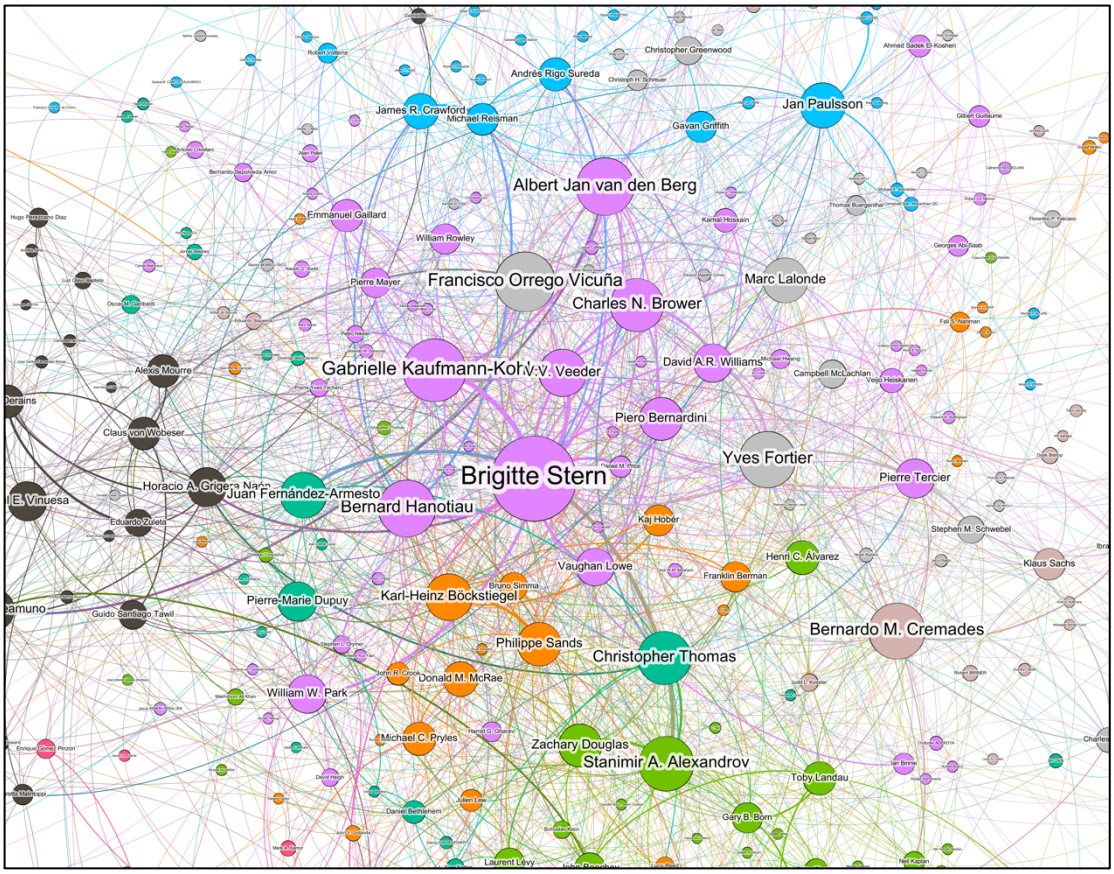
[45] Andrea K Bjorklund, 'The Emerging Civilization of Investment Arbitration Symposium: Building the Civilization of Arbitration' (2008) 113 Penn State Law Review 1269, 1272.

[46] Mark EJ Newman, 'Modularity and Community Structure in Networks' (2006) 103 Proceedings of the national academy of sciences 8577.

[47] See, in particular, Puig (n 45).

[48] Although the network deals with arbitrators only, it is submitted that the reflection can be adapted to counsel as well for simple reasons of frequent identity. See Langford, Behn and Lie (n 45).

Figure 1: A social network representation of arbitrators based on co-appointments.



Source: Niccolò Ridi on PITAD data.[49]

[49] See n44.

2.3 Why bother?

As we observed in the introduction, a significant amount of scholarship is produced in the field of investment arbitration. In a recent chapter, about arbitration literature in general, we observed that it

> … entertains a particular relationship with its own literature—the written knowledge in the field and about the field. This relationship is marked by one big mix, be it in the form of competition or cooperation, of practitioners who use it, legal entrepreneurs who make and change it, and scholars who analyse it, with more or less permanent alternations and confusions of these roles… in arbitration, this relationship (call it, quite normatively, expertise-enhancing cross-fertilisation or rather mind-narrowing dogmatic collusion, as you will) has a strength that would probably appear curious, and worth investigating, in many other fields in which public interests are at stake.[50]

We stick to our guns: *all* law is a social construct. And so is arbitration and every other legal institution. They are social constructs in two ways: one the one hand, we construct law and legal institutions in the sense that we shape them, straightforwardly determine what they should be and therefore what they are, what they become. Law is a noetic entity—something we human beings create, something we construct socially. On the other hand, law and legal institutions are also social constructs in the sense that our understanding of them is constructed socially. This is the case of our knowledge production about arbitration for instance—what we understand arbitration to be, to do, what effects it has, our representation and understanding it all. This is something we do, and we do this through all our filters, through all the things we want to see and the things we don't want to see, through all of our own values and interests.

To be sure, Gaston Bachelard had made the point long ago, showing that even the natural sciences, our understanding of physics and biology and neurophysiology is a social construct, as scientists filter data according to their own convictions, professional needs, and wider views of the world.[51] Even more persuasively, Bruno Latour and Steve Woolgar accounted for the role of practices and any day activities in the construction of reality's building blocks—the scientific facts.[52]

Thus, if we want to understand the world, we should also understand who produces knowledge about the world: who are the scientists, what is their ethos, what do they believe in, what are their professional constraints, where do their own personal interests lie? This, in a nutshell, is what we try to do for arbitration.

We are asking a simple question: how does knowledge about investment arbitration and investment get produced? By whom? With what effects on whom? What are the epistemic communities (or sub-communities if you believe that everyone who produces knowledge about these matters forms one "common" community)? What do people contribute, in what way, to the production of knowledge in this field, and what are their likely aesthetic prefigurations (by aesthetic we mean not quite metaphysics, but what is "behind the text', the likely objectives, beliefs, values, interests, wider rational and

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[50] Thomas Schultz and Niccolo Ridi, 'Arbitration Literature' in Federico Ortino and Thomas Schultz (eds), *The Oxford Handbook of International Arbitration* (OUP 2020) (footnotes omitted).

[51] See generally Gaston Bachelard, *La Formation de l'esprit scientifique. Contribution à une psychanalyse de la connaissance objective.* (Paris 1938).

[52] Bruno Latour and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (SAGE Publications 1979).

emotional framework of those people)? What does this tell us about what we think we know about investment arbitration and investment law and what should become of investment arbitration and investment law?

Somewhat more precisely, if we focus on scholars—those who produce scholarship—on how they produce knowledge: who are they? What is their likely ethos? How do they band together, cluster together in smaller communities? Who is inspired by whose ideas and by whose social reconstructions and images of what is happening and should be happening? Do these understandings of the world actually influence the decision-makings of arbitral tribunals?

3 Methodology

3.1 Scientometrics: scholarly citations

There are several ways to look at the evolution of scholarship, and indeed many have been applied to the study of legal scholarship. Because of the unique nature of the field of international investment arbitration, we have opted to resort to an approach that has been rarely employed in the study of legal scholarship: scientometrics.

Scientometrics has been defined as the "quantitative study of science, communication in science, and science policy'.[53] The paternity of the term and the development of scientometrics as a scholarship field is generally credited to Derek de Solla Price. Methodologically, it is a development of *bibliometrics*, or the "the quantitative methods of the research on the development of science as an informational process'. However, it is specifically concerned with "the exploration and evaluation of scientific research'.[54] Among the many uses and goals of scientometrics, we are particularly concerned with its potential for finding and understanding the "research front" in a particular theme or discipline, that is to say "an emergent and transient grouping of concepts and underlying research issues'.[55]

In the scientometrics market the citation is the main currency.[56] It serves as a flexible unit of measurements, one that makes good sense in the real world. One of the most striking examples is the fact that high citation counts have been, for a long time, positively associated with the subsequent impact, being correlated, for example, with the awarding of Nobel prizes[57]—a trend that more recent research has confirmed as accurate, if increasingly difficult to predict.[58]

After parsing citations from scholarly works, it is possible to employ a variety of techniques to make sense of the data. First of all, it is possible to simply count the

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[53] Loet Leydesdorff and Staša Milojević, 'Scientometrics' 2.

[54] John Mingers and Loet Leydesdorff, 'A Review of Theory and Practice in Scientometrics' (2015) 246 European Journal of Operational Research 1, 1.

[55] Chaomei Chen, 'CiteSpace II: Detecting and Visualizing Emerging Trends and Transient Patterns in Scientific Literature' (2006) 57 Journal of the American Society for Information Science and Technology 359.

[56] Mingers and Leydesdorff (n 56) 1.

[57] Gregory J Feist, 'Quantity, Quality, and Depth of Research as Influences on Scientific Eminence: Is Quantity Most Important?' (1997) 10 Creativity Research Journal 325, 326.

[58] Yves Gingras and Matthew L Wallace, 'Why It Has Become More Difficult to Predict Nobel Prize Winners: A Bibliometric Analysis of Nominees and Winners of the Chemistry and Physics Prizes (1901–2007)' (2010) 82 Scientometrics 401.

number of citations that are received (or made) by any scholarly work. High citation counts being accurate predictors of impact, this is important in its own right. However, it is possible to go beyond this approach and apply essential notions of network analysis to a scientific field, shifting the core research question to authorship, or, most importantly, to *who cites whom* or *what*.[59]

This can be done through co-authorship analysis, where individual nodes in the network (authors) are given greater connectedness on the basis of the number of works that they have authored together. Or it is possible to consider basic citation analysis, which shifts nodes closer together depending on the number of times two authors tend to cite each other. Still, it is possible to go further, making relatedness a function of how many times two works *are cited* together (co-citation analysis) or even of the number of times they cite the same works together. Although the possibilities are truly endless, the nature of a field structures affects the data collection process. The nature of the process is particularly well-suited to the discovery of "invisible colleges',[60] and we thus seek to confirm our hypotheses, anticipating encounters with islets, archipelagos, and whole continents.

In order to do so, we gather citation data on international law scholarship. This brings us to a common problem in scientometrics: citation analyses of this kind are only as good as what is fed to the machine. Generally speaking, Clarivate's Web of Science (WoS)[61] and Scopus[62] are the preferred sources for extracting citation data, which is thus rendered relatively uniform and may be downloaded in computer-readable format. However, the data so obtained is by no means perfect. Not only are these services not freely accessible, but they can also be fairly underinclusive (though rarely culpably), especially when scholarly works such as books and book chapters are concerned. This may be problematic in the context of investment arbitration scholarship, where different sources, some far less formal than others, all have their place.[63] The obvious alternative, Google Scholar, mitigates these problem, being freely accessible, speedy, and more thorough for the counting of sources such as books and SSRN.[64] It does, however, suffer from the opposite problem, being prone to over-inclusiveness, duplicate entries, and—most problematically—poor data quality on output.

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[59] For an overview, see Farideh Osareh, 'Bibliometrics, Citation Analysis and Co-Citation Analysis: A Review of Literature I' (1996) 46 Libri 149; Farideh Osareh, 'Bibliometrics, Citation Anatysis and Co-Citation Analysis: A Review of Literature II' (1996) 46 Libri 217; Howard D White and Katherine W McCain, 'Visualizing a Discipline: An Author Co-Citation Analysis of Information Science, 1972-1995' (1998) 49 Journal of the American society for information science 327.

[60] Diana Crane, 'Social Structure in a Group of Scientists: A Test of the "Invisible College" Hypothesis' (1969) 34 American Sociological Review 335; Oscar Schachter, 'Invisible College of International Lawyers' (1977) 72 Nw. UL Rev. 217; Markus Gmür, 'Co-Citation Analysis and the Search for Invisible Colleges: A Methodological Evaluation' (2003) 57 Scientometrics 27.

[61] <http://webofknowledge.com>.

[62] https://www.scopus.com/.

[63] Just like arbitral awards are sometimes sent out to colleagues or mailing lists prior to their formal publishing, the world of academia knows

[64] Anne-Wil K Harzing and Ron Van der Wal, 'Google Scholar as a New Source for Citation Analysis' (2008) 8 Ethics in science and environmental politics 61; Nabil Amara and Réjean Landry, 'Counting Citations in the Field of Business and Management: Why Use Google Scholar Rather than the Web of Science' (2012) 93 Scientometrics 553.

We chose quality over quantity, and thus obtained citation data from Scopus. The results were then processed with the VOSViewer software by Nees Jan van Eck and Ludo Waltman.[65]

It should be pointed out that this dataset suffers from an almost inevitable limitation, which has to do with language diversity: in the simplest of terms, it is almost impossible to gather data relating to sources published in languages other than English. This has to do with the way scholarship is published and indexed online, and with the circumstance that the largest and most used indexing services are inevitably biased towards the largest market—the English language one.

If the assumption that scholarship published in different languages must be irrelevant seems too much of a stretch,[66] there seem to be enough anecdotal evidence to suggests that the status of English as the *lingua franca* of scientific communication may make the limitation more tolerable.[67]

3.2 Citation mining: arbitral citations

As explained above, citation to scholarly authorities is not at all too rare in investment decisions. Thus, we have sought to provide some measurement of the impact of scholarship on investment arbitration. For our present purposes, we eschew contextual analysis and simply rely on citation count, with some variations which will be explained where relevant. In our analysis we focus on the full text of all publicly available investment decisions. After converting the PDF documents in a machine-readable format, we search for results matching a most types of bibliographic referencing formats by using regular expressions.[68] We compare our results with those provided by the commercial database Investor-State Law Guide Publication Citator and reach comparable accuracy.[69]

In our investigation we are concerned—the point is worth stressing once more—with the identification of a "research front'. This approach, we argue, is designed to be consistent with the general consensus portraying international investment law as a fast-evolving field. In light of these assumptions, we have limited our investigation on arbitral citations to articles appearing in periodicals.[70] This is not so much imposed by the laboriousness of the citation collection process, but rather by a number of core assumptions. First, because of their reliable publication cycle, peer review, and editorial

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[65] Nees Jan van Eck and Ludo Waltman, 'Visualizing Bibliometric Networks', *Measuring Scholarly Impact* (Springer, Cham 2014) <https://link.springer.com/chapter/10.1007/978-3-319-10377-8_13> accessed 27 April 2018. The software (free, but not Open Source) can be downloaded from <http://www.vosviewer.com>.

[66] Thomas Schultz, *Transnational Legality: Stateless Law and International Arbitration* (OUP 2014) 153 ff.

[67] See in general C Tardy, 'The Role of English in Scientific Communication: Lingua Franca or Tyrannosaurus Rex?' (2004) 3 Journal of English for Academic Purposes 247.

[68] For an early introduction to the concept of regula expressions (and their elegance) see Ken Thompson, 'Programming Techniques: Regular Expression Search Algorithm' (1968) 11 Communications of the ACM 419.

[69] https://www.investorstatelawguide.com, accessed 8 February 2020.

[70] We have made any effort to eliminate odd chapters that were parsed by overinclusive regular expressions. We decided to include, for the time being, works contained in the collected courses of the Hague Academy of International Law because of their specific type of publication cycle, and as a control variable.

control, we posit that articles may be seen as providing the most reasonable way for a practitioner to stay abreast of recent development. Second, monographs and edited volumes are generally understood to have a different—and longer—citation lifetime, thus rendering comparisons exceedingly problematic.

3.3 Caveat

Although these problems mean that the selection and the analysis of the material will inevitably have some minor shortcomings. We therefore caution against coming to quick conclusions. Our analysis, too, will be somewhat impressionistic at this stage. Yet, we submit that the data we present maintains its overall illustrative value, and we offer it in the hope that our findings will contribute to clarify the complex evolution of international investment arbitration as a scholarly endeavour.

4 Data

4.1 Investigation 1: scholars citing scholars

Our analysis starts from scholarly citations as a proxy for the identification of those "grouping[s] of concepts and underlying research issues" making up the research front, as well as the most influential scholars in it.

4.1.1 The general picture: a concept map

As a first step in our analysis, we used VOSviewer to create a map based on text data—specifically, data extracted from the abstract and title fields.[71] The resulting network, in which two word nodes are closer together based on how often they occur together, while their size reflects the sheer number of mentions, is then overlaid with a colour scheme reflecting publication years.[72]

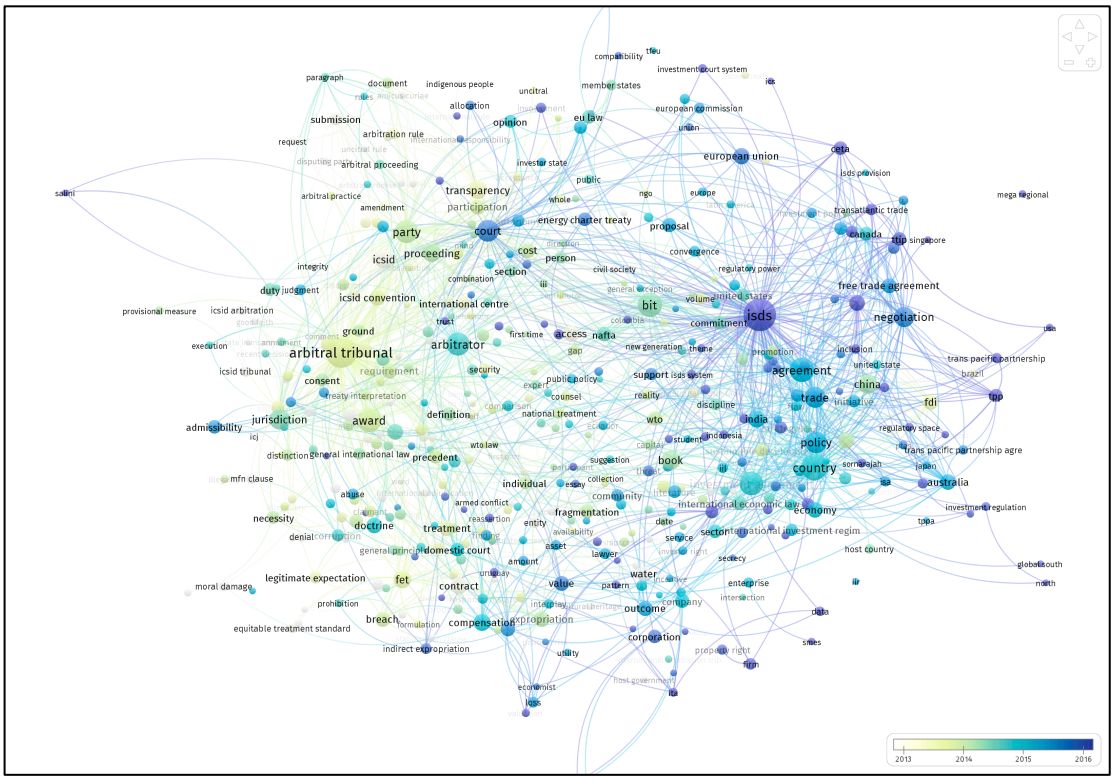
[71] VOSviewer applies some pre-processing, including part-of-speech tagging and removal of copyright statements, in order to identify keywords. See Nees Jan van Eck and Ludo Waltman, 'Text Mining and Visualization Using VOSviewer' [2011] arXiv:1109.2058 [cs] <http://arxiv.org/abs/1109.2058> accessed 21 March 2020. Naturally, the algorithm cannot do much against instances of poetic license in titles.

[72] Nees Jan Van Eck and Ludo Waltman, 'VOSviewer Manual' (2013) 1 Leiden: Univeristeit Leiden 1, 8.

Figure 2, below, shows a specific snapshot of one such map, capturing the a time window ranging from 2013 to 2017. It provides a clear picture of how the focus on international investment law scholarship quickly shifted from the analysis of arbitral decisions and procedure to the discussion of more complex and variegated issues, such as the interaction between international investment law and European law, as well as questions concerning the reform of the investment law system, as well as the potential role of convergence with trade law—and the analogies resulting thereof—in the context of the rise of mega-regional agreements.[73]

[73] As an example, see Tania Voon, 'Consolidating International Investment Law: The Mega-Regionals as a Pathway towards Multilateral Rules' (2018) 17 World Trade Review 33.

Figure 2: Concept map based on abstract and title data, overlaid with publication years



Source: The authors' analysis of Scopus citation data

4.1.2 The general picture, continued: co-citation networks and authors

In keeping with the orthodoxy in scientometrics, we employ co-citation networks to identify the structure of the field. Rather than focusing on articles and themes, we choose to focus instead on author. Accordingly, our analysis retains some impressionistic character in that we focus on what an author is mostly known for, rather than on their entire scholarly production.

The co-citation networks allow us to test this type of heuristic. As a reminder, the size of the nodes is a function of the number of citations, whereas the connectedness of two authors follows from the number of times they have been cited together. As Figure 3 shows, a number of large and well-populated clusters may be identified in the wider international investment law and arbitration scholarship network.

The cluster on the bottom right corner, in red, appears to group a number of scholars whom we can define as being universally recognised authorities: the group is remarkable in that it includes authors of key texts—such as commentaries,[74] Hague Academy courses, and textbooks[75]—but also because it largely comprises individuals who have also acted as practitioners, and have who have been celebrated as key figures of both commercial arbitration (consider, for example, the inclusion of Nigel Blackaby and Emmanuel Gaillard) or public international law (such as James Crawford).

On the contrary, the cluster to the right, in blue, provides evidence of a different trend within the research front: this group includes the likes of Susan Franck, Gus Van Harten, and David Schneidermann, as well as Michael Waibel and Sergio Puig. In other words, the cluster includes authors who have been writing not so much *of* international investment law and arbitration, but rather *on* it, tacking systemic perspectives on its significance as an institution (often through the use of analogies),[76] its legitimacy and challenges,[77] and its general significance—sometimes through empirical analysis.[78]

A remarkable feature of the network is the centrality retained by certain individuals, whose production may be said to have straddled the line between the systemic dimension and the more doctrinal, black letter analysis of specific legal questions, and who therefore tend to be well-connected to several "camps'—or, to put the matter in different, and not incompatible terms, to be extremely "citable'. Key authors here are Stephan Schill, Jan Paulsson, Jurgen Kurtz, and Anne Van Aaken, who all have tackled

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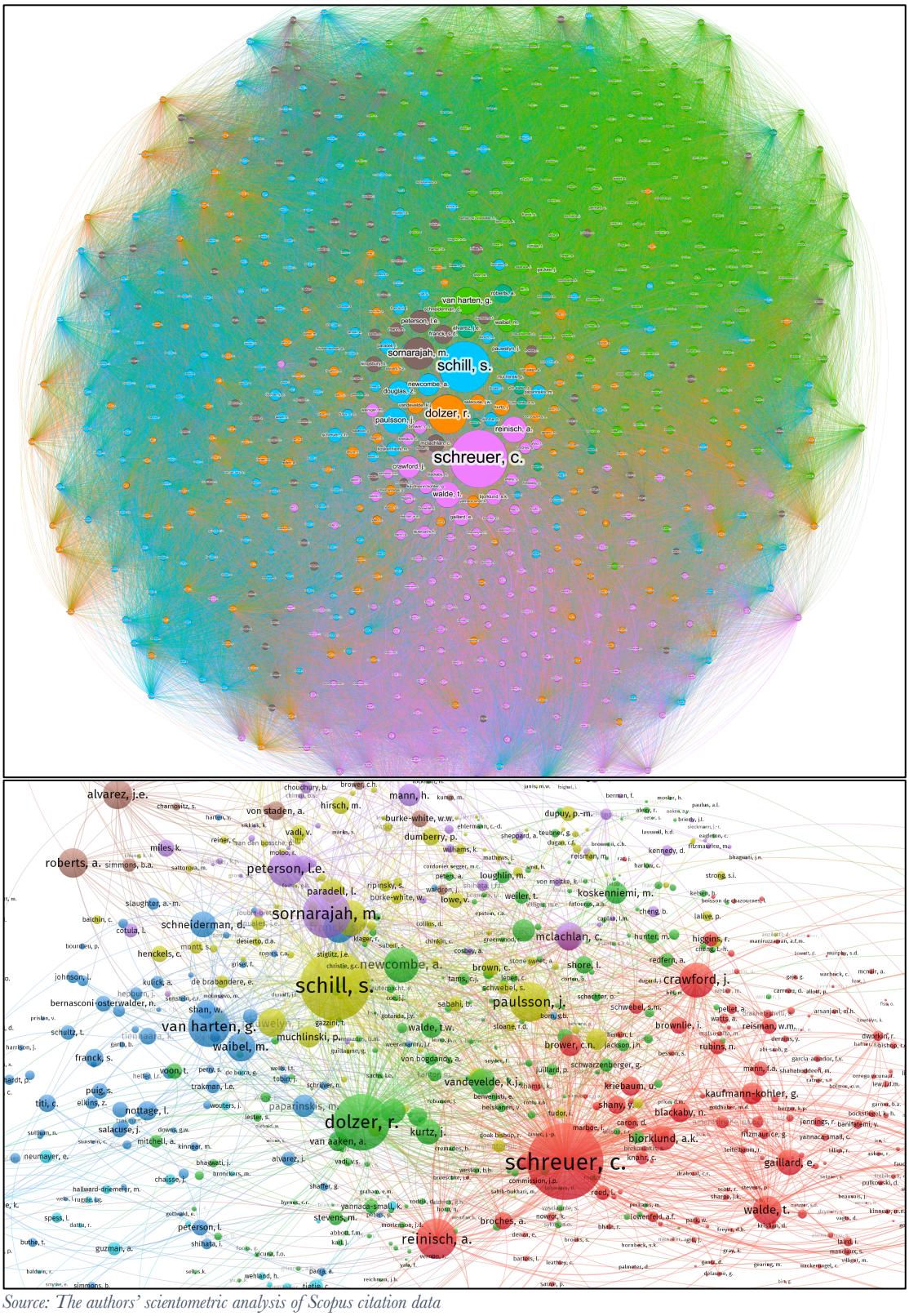
[74] Christoph H Schreuer and International Centre for Settlement of Investment Disputes, *The ICSID Convention: A Commentary* (Cambridge University Press 2001); Christoph H Schreuer, *The ICSID Convention: A Commentary* (Cambridge University Press 2009).
[75] Nigel Blackaby and others, *Redfern and Hunter on International Arbitration* (Oxford University Press 2015).
[76] Gus Van Harten and Martin Loughlin, 'Investment Treaty Arbitration as a Species of Global Administrative Law' (2006) 17 European Journal of International Law 121; Gus Van Harten, 'Investment Treaty Arbitration and Public Law' [2007] OUP Catalogue; David Schneiderman, *Constitutionalizing Economic Globalization: Investment Rules and Democracy's Promise* (Cambridge University Press 2008); Roberts (n 8).
[77] Susan D Franck, 'Legitimacy Crisis in Investment Treaty Arbitration: Privatizing Publlic International Law through Inconsistent Decisions, The' (2004) 73 Fordham Law Review 1521; Michael Waibel (LL M.), *The Backlash Against Investment Arbitration: Perceptions and Reality* (Kluwer Law International 2010).
[78] Puig (n 45).

systemic questions, challenging existing paradigms through bold comparisons,[79] but also largely retained a role as writers of more to-the-point commentaries.

[79] No list could be exhaustive, but the following may be seen as key publications Jan Paulsson, 'Arbitration Without Privity' (1995) 10 ICSID Review - Foreign Investment Law Journal 232; Paulsson, *The Idea of Arbitration* (n 38); Stephan W Schill, *The Multilateralization of International Investment Law* (Cambridge University Press 2009); Schill, *International Investment Law and Comparative Public Law* (n 8); Anne van Aaken, 'International Investment Law Between Commitment and Flexibility: A Contract Theory Analysis' (2009) 12 Journal of International Economic Law 507; Jürgen Kurtz, 'The Use and Abuse of WTO Law in Investor-State Arbitration: Competition and Its Discontents: A Rejoinder to Robert Howse and Efraim Chalamish' (2009) 20 European Journal of International Law 1095; Jürgen Kurtz, *The WTO and International Investment Law: Converging Systems* (Cambridge University Press 2016).

Figure 3: The main co-citation network (full network and enhanced close-up)



Source: The authors' scientometric analysis of Scopus citation data

4.1.3 Ranking authors: citation and PageRank scores

Co-citation networks of this kind can also be employed to draw inferences as to the most influential authors in it. We do so by adopting two types of measurements: citation weight as a raw measure, and PageRank.

The first measurement is a pure function of the number of citations of a given author within the network, and is therefore highly correlated with a basic type of network centrality known as *degree centrality*, the second type of scores are computed using a more complex algorithm, PageRank, which has been developed for the purposes of ranking web pages and is still one of the foundations of the Google search engine.[80] It provides for a better ranking of nodes by accounting for a more developed notion of importance: with inevitable oversimplification, PageRank scores depend not just on the number of links from a node to the other, but also on the quality of these links. The latter is in turn determined largely on the basis of the quality of the linking nodes—in other words, a node is more important if important nodes link to it, and so on, with PageRank scores being calculated recursively. The PageRank algorithm also accounts for an element of randomness and the possibility that a "random surfer" reading the works included in the citation network will, at some point, stop following a chain of links.[81]

Interestingly, the PageRank algorithm has found some use in the analysis of co-citation networks too, providing for a better measure of a "lifetime contribution" to the field.[82] Its application to our dataset yields interesting results in that the picture painted by PageRank scores is more variegated than that obtained through mere citation counts. Figure 4 and Figure 5 show the same co-citation network in a dual circle layout in order to highlight the contribution of the 25 highest-ranked authors. As the two figures show, there are significant overlaps between the two measurements, in line with the findings made by Ding and others on this methodology.[83] However, the first figure clearly shows the relatively repetitive citation trends of certain authorities, while the second provides more variation, reflecting the different trends discussed above. In other words, a ranking of this kind reflects the importance of different authors for different sub-areas of the field.

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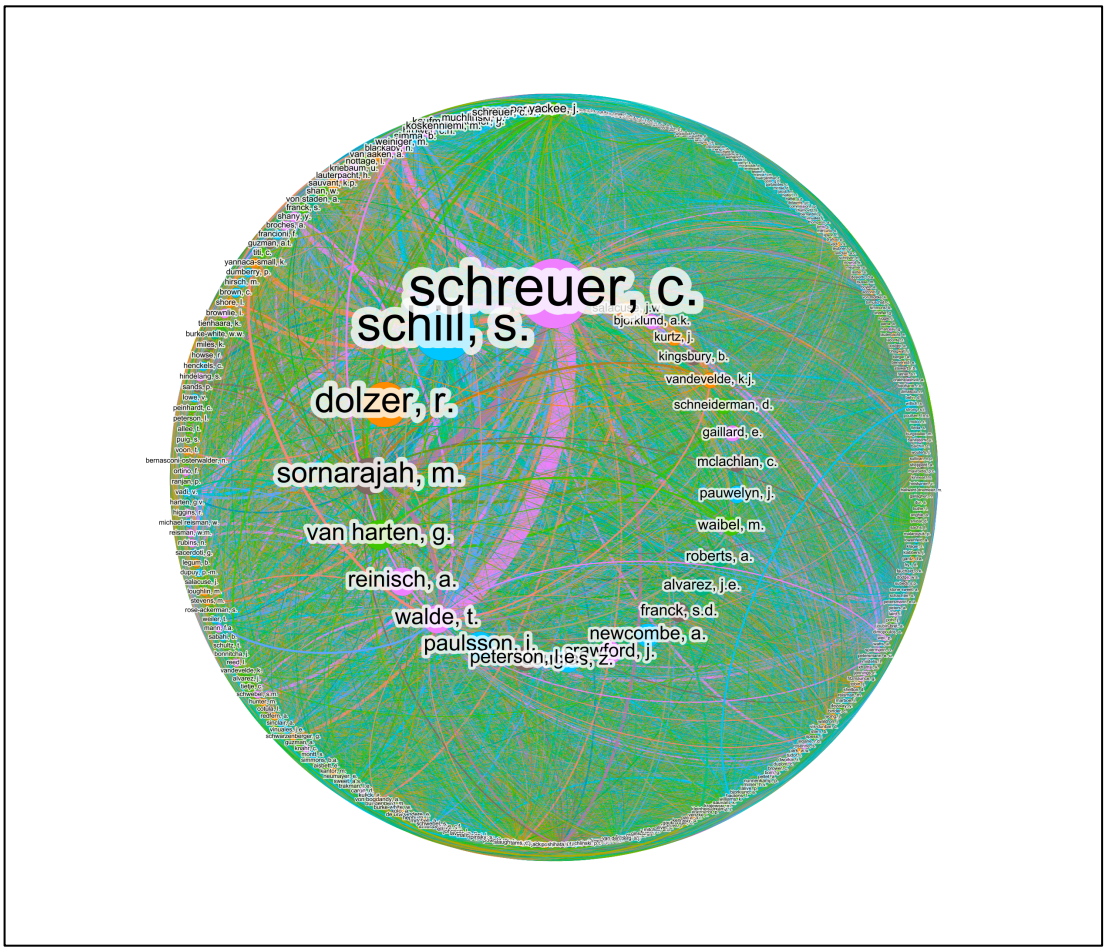
[80] Lawrence Page and others, 'The PageRank Citation Ranking: Bringing Order to the Web.' (Stanford InfoLab 1999).

[81] For a critique of certain applications of PageRank see Gourab Ghoshal and Albert-László Barabási, 'Ranking Stability and Super-Stable Nodes in Complex Networks' (2011) 2 Nature Communications 394.

[82] Ying Ding and others, 'PageRank for Ranking Authors in Co-Citation Networks' (2009) 60 Journal of the American Society for Information Science and Technology 2229.

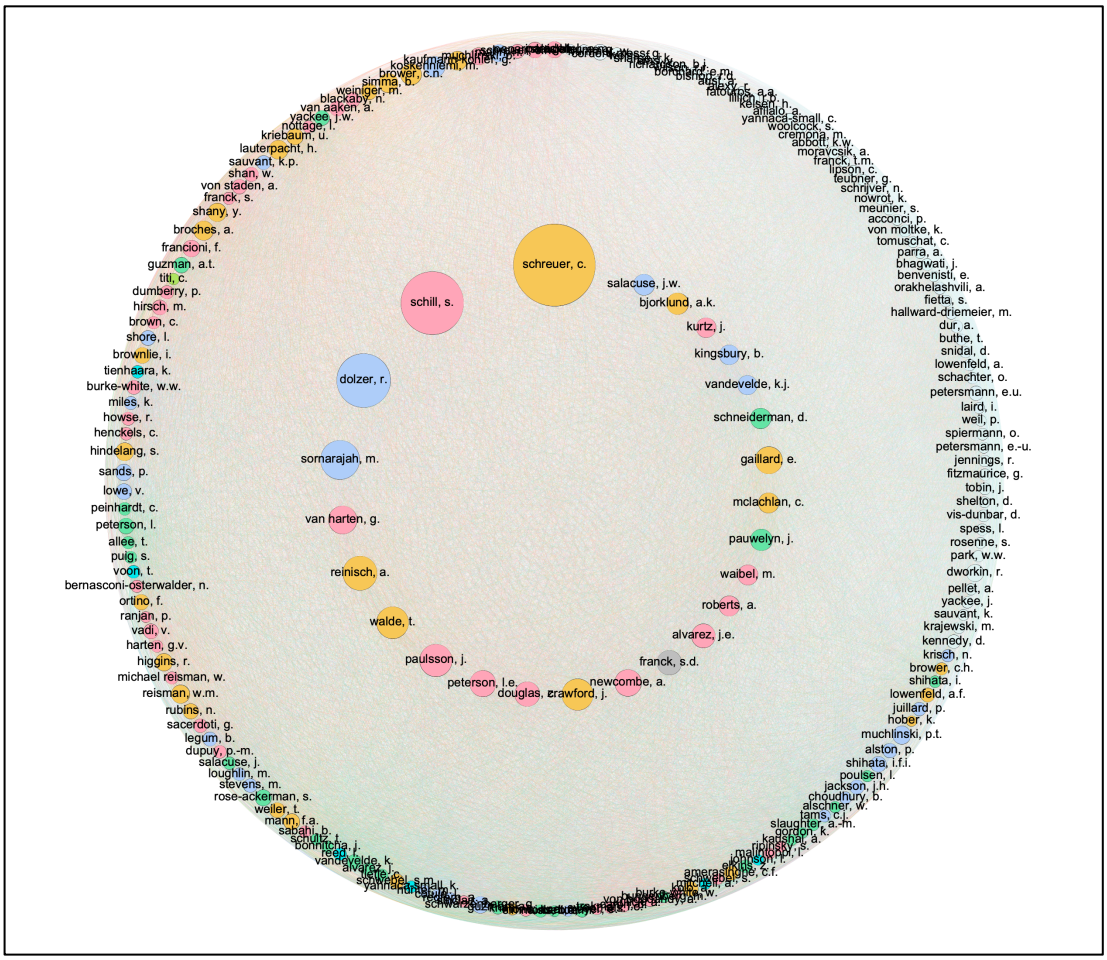
[83] ibid.

Figure 4: Co-citation network with a citation-weighted ranking



Source: Source: The authors' scientometric analysis of Scopus citation data

Figure 5: Citation network with PageRank ranking of nodes (only highest scores displayed filtered)



Source: Source: The authors' scientometric analysis of Scopus citation data

4.2 Investigation 2: arbitrators citing scholars

As anticipated in the introductory sections, scholarship may well be cited by arbitrators when "writing judicially'. The citation of legal scholarship by adjudicatory bodies is, of course, a well-investigated subject both in the context of domestic jurisdictions and international courts.[84] In the context of international investment arbitration, however, while a role for scholarship is acknowledged by the several citations that appear in tribunals" decisions, no serious attempt has been made to engage in a more analytical observation of what and who, precisely, is cited.

There are good reasons to ask this question: first, understanding what arbitrators find important might give us some insight into which issues are still open, or wholly settled, in their line of work; by the same token, their citation patterns can also elucidate how

[84] Fauchald (n 10); Peil (n 21); Helmersen, 'The Use of Scholarship by the WTO Appellate Body' (n 22); Sondre Torp Helmersen, 'The Application of Teachings by the International Court of Justice' (University of Oslo 2018).

their arguments from authority—and, thus their citations to both precedent and scholarship—take advantage of specific works, and on which topics.

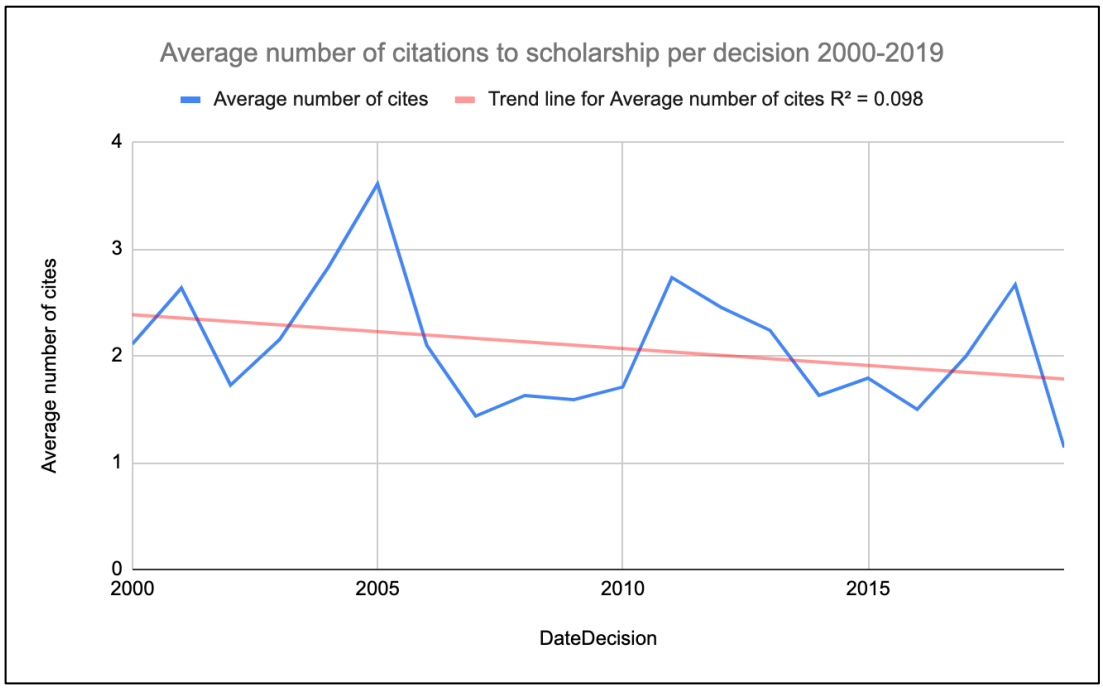
4.2.1 General findings

We start with two general observations concerning the extent to which international investment tribunals tend to cite scholarship. Our data broadly confirms the trend already identified in Fauchald's 2008 empirical survey, confirming that scholarship is cited frequently.

The graph in Figure 6 plots the number of unique citations (that is to say, excluding repeated citations within a same document) to scholarship contained in periodicals in international investment decisions in the period 2000-2019. It is possible to observe that the number of citations has dipped, but only to a small extent. When the number of citations is considered in context, however, it is possible to observe that the number of citations to literature pales in comparison to that of citations to arbitral precedent (

Figure 7 below),[85] which keeps outpacing the number of decisions issued each year. An increase in references to precedents, rather than literature, has been documented elsewhere—for example, in the practice of the WTO Appellate Body.[86]

Figure 6: Average number of unique citations to journal articles in international investment arbitration decisions (2000-2019)

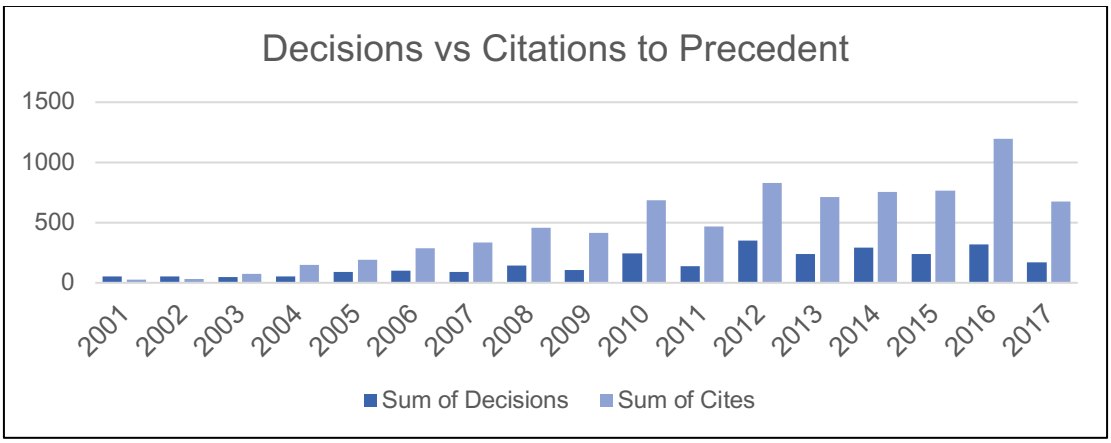


[85] The data on the use of precedent builds on prior work carried out with similar methodologies. See Niccolò Ridi, '"Mirages of an Intellectual Dreamland"? Ratio, Obiter and the Textualization of International Precedent' (2019) 10 Journal of International Dispute Settlement 361; Niccolò Ridi, 'The Shape and Structure of the "Usable Past": An Empirical Analysis of the Use of Precedent in International Adjudication' (2019) 10 Journal of International Dispute Settlement 200; Niccolò Ridi, 'Doing Things with International Precedents: The Use and Authority of Previous Decisions in International Adjudication' (King's College London 2019).

[86] Helmersen, 'The Use of Scholarship by the WTO Appellate Body' (n 22).

Source: The authors' text-as-data analysis and Investor-State Law Guide

Figure 7: Number yearly decisions and cumulative number of unique citations to arbitral precedent



Source: Niccolò Ridi[87]

4.2.2 The shelf life of scholarship: How sensitive is the international bench to an evolving research front?

Another important question to be asked is the following: having considered the extent to which scholarship is cited in general, can we establish just how much *recent* scholarship is referenced? A measurement of this type might allow us to gain additional insights into the mindset of arbitrators, quantifying their *need* for up-to-date literature assuming depreciation of the source material,[88] and, taking a look at the other side of the coin, gauging their general responsiveness to an evolving research front.

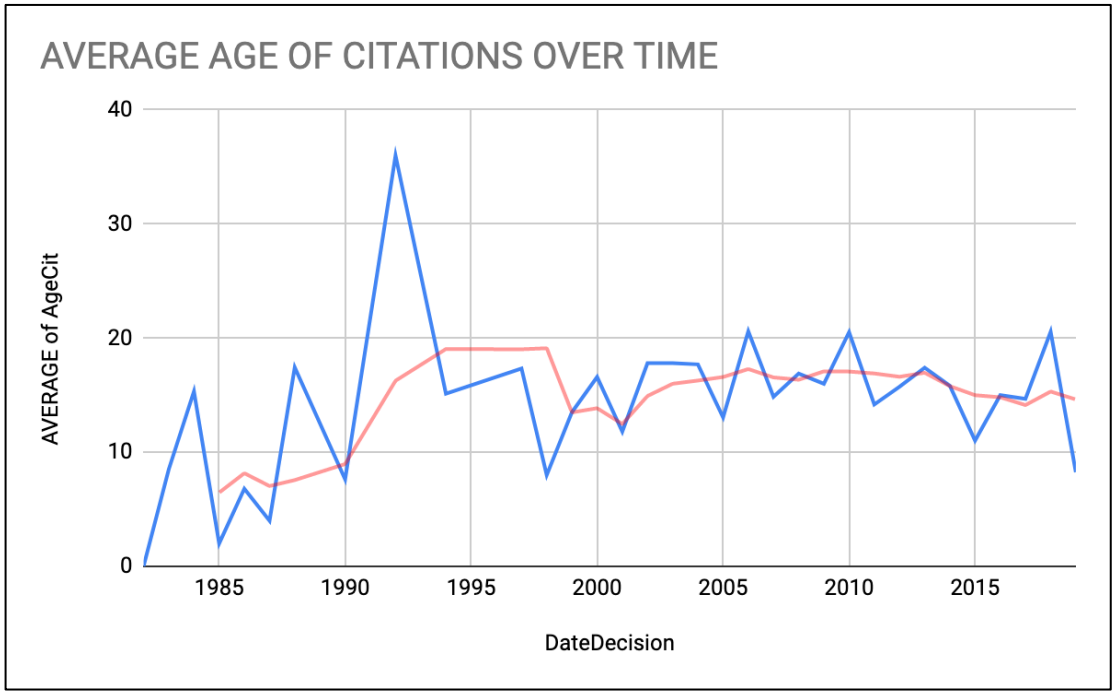
Interestingly, when a comparison is made with citations to precedent, the picture painted by the data is quite different from the scenario discussed in the previous section. Indeed, as Figure 8 shows, the average age of articles cited by arbitrators is just over 15 years. While this value might appear high at first sight, especially for a relatively young field such as international investment law, it is in fact far from an excessive number, especially when considering that rather old articles continue to be cited, thereby distorting the average.[89] Indeed, the most striking feature of the practice is the fact that, after an initial increase, the average age of cited articles is *not* growing significantly—and, in fact, a reverse trend might be observed.

This particular aspect of the citing practice does not mirror the trends concerning the use of precedent across not just investment tribunals, but international courts and

[87] Ridi, 'Doing Things with International Precedents: The Use and Authority of Previous Decisions in International Adjudication' (n 87); Ridi, 'The Shape and Structure of the "Usable Past"' (n 87).
[88] On the question of depreciation see, with reference to precedent, William M Landes and Richard A Posner, 'Legal Precedent: A Theoretical and Empirical Analysis' (1976) 19 Journal of Law & Economics 249, 276.
[89] See for example FA Mann, 'British Treaties for the Promotion and Protection of Investments' (1982) 52 British Yearbook of International Law 241.

tribunals writ large. As Figure 9 shows, the average age of precedents is consistently increasing across international adjudicators.[90] The resulting picture is relatively clear: arbitrators have been rather responsive to an evolving research front, often choosing to cite relatively recent scholarship. Undoubtedly, the case of international investment law is a rather extraordinary one, as the numbers of decisions and scholarly outputs have grown side by side. Yet, arbitrators do not seem so tied by either reverence to the past or availability heuristics[91] in the citation of literature as they are when selecting citable precedents.

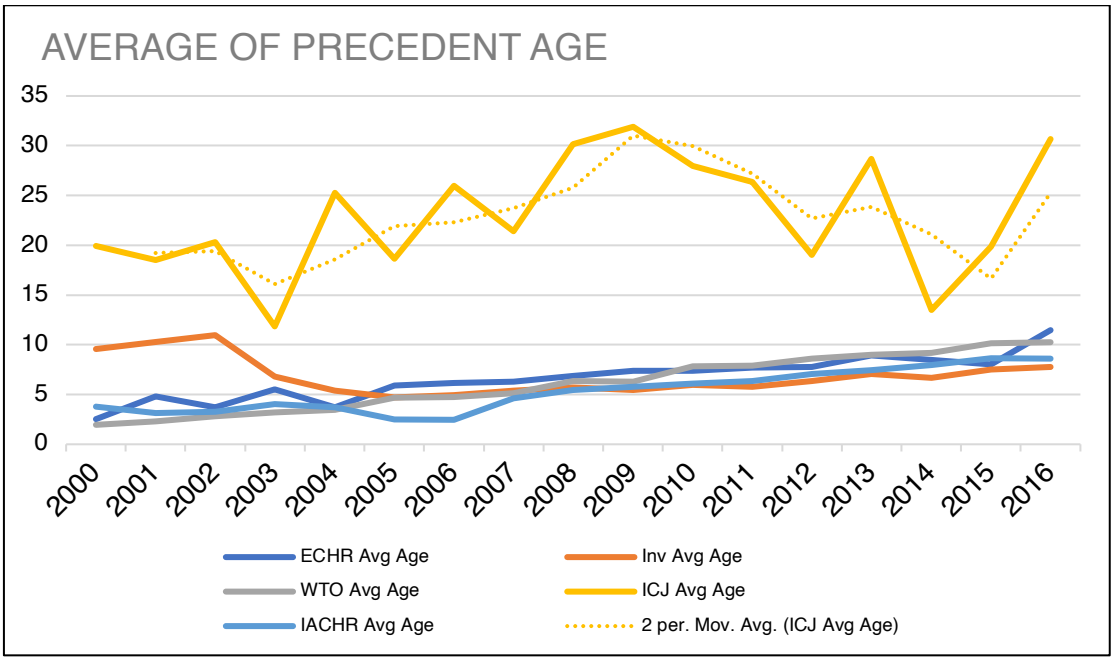
Figure 8: Average age of citations over time (with moving average, period of 4)



Source: The authors' scientometric analysis of Scopus citation data

[90] Ridi, 'The Shape and Structure of the "Usable Past"' (n 87) 210.
[91] Norbert Schwarz and others, 'Ease of Retrieval as Information: Another Look at the Availability Heuristic' (1991) 61 Journal of Personality and Social Psychology 195.

Figure 9: Average precedent age



Source: Niccolò Ridi[92]

4.2.3 The most cited authors

Finally, it is fitting at this point to identify the authors who have received the highest number of citations in investment arbitration decisions, with a view to determine, in particular, what type of scholarship arbitrators seek to rely on, and whether or not success in terms of arbitral and scholarly citations have any degree of correlation.

The tables below, provide a breakdown of the number of citations (to unique outputs and cumulative) made in investment decisions. Table 1 comprises all published decisions available as of October 2019, while Table 2 only focuses on the period 2013-2019.

The results are, once again, quite striking. Authorities such as Christoph Schreuer, Emmanuel Gaillard, and Rudolf Dolzer feature prominently in both lists, as do authors with an institutional connection such as Aaron Broches. Yet, important changes can be observed, for example in the rising importance of voices from a new generation, such as Zachary Douglas (far more prominent in the second list than in the first), Michael Waibel, and Stephan Schill. At the same time, one can easily observe the decline in citation of older sources, often produced by experts in public international law: two notable examples may be seen in the works of Dame Rosalyn Higgins and C.F. Amerashinghe. Of course, it goes without saying that views on the taking of property

[92] Ridi, 'Doing Things with International Precedents: The Use and Authority of Previous Decisions in International Adjudication' (n 87); Ridi, 'The Shape and Structure of the "Usable Past"' (n 87).

in international law have evolved,[93] as has the debate on the jurisdiction of ICSID tribunals.[94] What matters, however, is that new authors are entering the field, as is natural in any evolving research front.

Table 1: Most cited authors in arbitral jurisprudence - all time

Author	**COUNTUNIQUE of Source**	**COUNTA of Source**
Christoph Schreuer	54	58
Aron Broches	42	48
Emmanuel Gaillard	22	22
Georges R. Delaume	20	25
Frederick Alexander Mann	20	20
Rudolf Dolzer	16	16
Pierre Lalive	16	16
John Y. Gotanda	16	16
Gabrielle Kaufmann-Kohler	16	17
Jan Paulsson	15	16
Zachary Douglas	14	14
Chittharanjan Felix Amerasinghe	12	17
Rosalyn Higgins	11	11
Louis B. Sohn and R.R. Baxter	11	11
Antonio R. Parra	11	11
Stephen Vasciannie	10	10

[93] Higgins Rosalyn, 'The Taking of Property by the State: Recent Developments in International Law' [1982] 176 Recueil Des Cours 259 338.

[94] Chittharanjan Felix Amerasinghe, 'Submissions to the Jurisdiction of the International Centre for Settlement of Investment Disputes' (1973) 5 J. Mar. L. & Com. 211; Chittharanjan Felix Amerasinghe, 'Jurisdiction Ratione Personae under the Convention on the Settlement of Investment Disputes between States and Nationals of Other States' (1975) 47 British Yearbook of International Law 227; Chittharanjan Felix Amerasinghe, 'The International Centre for Settlement of Investment Disputes and Development through the Multinational Corporation' (1976) 9 Vand. J. Transnat'l L. 793; Chittharanjan F Amerasinghe, 'The Jurisdiction of the International Centre for the Settlement of Investment Disputes' (1979) 19 Indian Journal of International Law 166.

Michael W. Reisman & Robert D. Sloane	10	10
Giorgio Sacerdoti	8	8
D. H. Bowett	8	8
James Crawford	7	7
George C. Christie	7	7
Filip De Ly and Audley Sheppard	7	11
Andrew Newcombe	7	7
Irmgard Marboe	6	6
Gerald Fitzmaurice	6	6

Table 2: Most cited authors in arbitral jurisprudence - 2012-2019

Author	**COUNTUNIQUE of Source**	**COUNTA of Source**
Christoph Schreuer	17	18
Aron Broches	15	16
Zachary Douglas	7	7
John Y. Gotanda	7	7
Rudolf Dolzer	6	6
Filip De Ly and Audley Sheppard	5	8
James Crawford	4	4
Francisco Orrego Vicuña	4	4
Emmanuel Gaillard	4	4
Stephen M. Schwebel	3	3
Natasha Affolder	3	3
Michael Waibel	3	3
Mark B. Feldman	3	3
Irmgard Marboe	3	3
Gerald Fitzmaurice	3	3
Georges R. Delaume	3	4

Campbell McLachlan	3	3
William S. Dodge	2	2
Ursula Kriebaum	2	2
Thomas Wälde	2	2
Thomas Kendra	2	2
Stephan W. Schill	2	2
R. Håkan Berglin	2	2
Michael W. Reisman and Robert D. Sloane	2	2
Louis B. Sohn and R.R. Baxter	2	2

4.2.4 The most cited works

As a final point, it might be worth considering, however briefly, *which* works specifically are cited by investment tribunals. Table 3, below, provides one such list, including—once again—unique and cumulative citations. For reasons of space, and due to the impressionistic nature of our analysis, we restrict ourselves to a single reflection: it is virtually impossible to spot in this list any work with a systemic or critical ambition—at least in the sense that we discussed in the context of scholarly "clusters'. Rather, most of the scholarship listed here appears, with some possible exceptions,[95] to target specific, real world problems, and to be citable with a view to solving them. Further research will be needed to determine whether this is necessarily the case.

Table 3: Scholarly works with the most arbitral citations

Target	COUNTUNIQUE of Source	COUNTUNIQUE of DateDecision
Broches, "The Convention on the Settlement of Investment Disputes between States and Nationals of Other States" 136:2 Recueil des cours 331 (1972).	27	19
Schreuer, "Fair and Equitable Treatment in Arbitral Practice" 6:3 Journal of World Investment and Trade 357 (2005).	25	11
International Centre for Settlement of Investment Disputes (ICSID), "Background Paper on Annulment for the Administrative Council of ICSID" 27:2 ICSID Review 443 (2012).	21	6

[95] For example, one may wonder if this is the case with regard to Paulsson, 'Arbitration Without Privity' (n 81); Kaufmann-Kohler (n 36).

Mann, "British Treaties for the Promotion and Protection of Foreign Investment" 52 British Yearbook of International Law 241 (1982).	16	11
Kaufmann-Kohler, "Arbitral Precedent: Dream, Necessity or Excuse?: The 2006 Freshfields Lecture" 23:3 Arbitration International 357 (2007).	14	6
Lalive, "The First "World Bank" Arbitration (Holiday Inns v. Morocco) - Some Legal Problems" 51 British Yearbook of International Law 123 (1980).	12	10
"Draft Convention on the Responsibility of States for Damage done in their Territory to the Person or Property of Foreigners" 23 American Journal of International Law, 131 (1929).	12	10
Sohn and Baxter, "Responsibility of States for Injuries to the Economic Interest of Aliens" 55 American Journal of International Law 545 (1961).	11	8
Schreuer, "Commentary on the ICSID Convention" 11 ICSID Review - Foreign Investment Law Journal 318 (1996).	11	9
Vasciannie, "The Fair and Equitable Treatment Standard in International Investment Law and Practice" 70 British Yearbook of International Law 1999 99 (2000).	10	4
Higgins, "The Taking of Property by the State: Recent Developments in International Law" 176:3 Recueil des Cours 259 (1982).	10	9
Reisman and Robert D. Sloane, "Indirect Expropriation and its Valuation in the BIT Convention" 74 British Yearbook of International Law 115 (2004).	10	7
Dolzer, "Fair and Equitable Treatment: a Key Standard in Investment Treaties" 39:1 The International Lawyer 87 (2005).	9	5
Douglas, "The MFN Clause in Investment Arbitration: Treaty Interpretation Off the Rails" 2:1 Journal of International Dispute Settlement 97 (2011).	8	6
Paulsson, "Arbitration without Privity" 10:2 ICSID Review: Foreign Investment Law Journal 232 (1995).	8	6
Sacerdoti, "Bilateral Treaties and Multilateral Instruments on Investment Protection" 269 Recueil des Cours 251 (1997).	8	5

Bowett, "Estoppel before International Tribunals and Its Relation to Acquiescence" 33 British Yearbook of International Law 176 (1957).	8	7
Delaume, "Le centre international pour le règlement des différends relatifs aux investissements" 109 Journal du Droit International 775 (1982).	7	6
Christie, "What Constitutes a Taking Under International Law?" 33 British Yearbook of International Law 308 (1962).	7	3
Broches, "The Convention on the Settlement of Investment Disputes: Some Observations on Jurisdiction" 5 Columbia Journal of Transnational Law 261 (1966).	7	5
Newcombe, "The Boundaries of Regulatory Expropriation in International Law" 20:1 ICSID Review - Foreign Investment Law Journal 1 (2005).	7	4
Gotanda, "Awarding Interest in International Arbitration" 90 American Journal of International Law 40 (1996).	6	5
Marboe, "Compensation and Damages in International Law – The Limits of "Fair Market Value"' 7:5 Journal of World Investment and Trade 723 (2006).	6	4
Broches, "Observations on the Finality of ICSID Awards" 6:2 ICSID Review 231 (1991).	6	5
Fortier and Stephen L. Drymer, "Indirect Expropriation in the Law of International Investment: I Know It When I See It, or Caveat Investor" 19 ICSID Review - Foreign Investment Law Journal 293 (2004).	5	5

5 Findings and final reflections

Our research paints a complicated picture. On the one hand, our data provides a clear representation and mapping of the research front in international investment law and arbitration literature. As our scientometric analysis shows, we can identify distinct clusters of authors and the trends and methodologies they follow, and point to the most influential and "central" players in the field. On the other hand, the comparison between scholarly citations and arbitral ones shows that a rift exists between what scholars on one side, and practitioners on the other, find useful—or are, at any rate, comfortable citing. As discussed above, the observation that the lectern and the bench

may well find support and solace in different literature is nothing new.[96] It is the extent to which it is true that is striking.

This point leads us to our final conclusion: while presenting this paper at a splendidly organized and extremely well-attended conference, we concluded—mostly, but not quite entirely, joking—by observing the following:

> Do you want to be cited? Write doctrinal scholarship.
> Do you want to be an authority? Write doctrinal scholarship.
> Do you want to please everyone? Write empirical and theoretical scholarship.

Through the analysis of our data, we are now a little wiser, but these three axioms seem to hold. True, they are likely going to be of little help to a scholar wishing to direct her efforts towards a marketable result. It is our hope, howver, that our analysis will nevertheless retain its value, and help in the navigation of a quickly evolving field and its research front. And hopefully, just hopefully, prompt some reflection on what it means for scholarship to be useful.

[96] See Deborah J Merritt and Melanie Putnam, 'Judges and Scholars: Do Courts and Scholarly Journals Cite the Same Law Review Articles' (1995) 71 Chi.-Kent L. Rev. 871.