

# Applications of ABM in International Legal Research

The Case of Compliance

Katharina Luckner <sup>1,2</sup>, Veronika Fikfak <sup>1,2</sup>

<sup>1</sup> Institute of Law and Economics, University of Hamburg, Johnsallee 35, 20148 Hamburg, Germany

<sup>2</sup> Human Rights Nudge Project, iCourts, University of Copenhagen, Karen Blixens Plads 16, DK-2300 Copenhagen S, Denmark

## Abstract

Agent-based modeling has been largely overlooked in international legal research, even though it could be used to gain insights into the highly complex processes of state behavior relevant to international law that can only be insufficiently addressed with other methods. On the basis of a concrete application – state compliance with European Court of Human Rights judgments – we show the applicability of agent-based modeling to international legal research. We discuss its implications for two levels of analysis: (1) understanding the drivers of state behavior, which contributes to the international law research with unitary state actors at its center, and (2) within state dynamics and their influence during the compliance process, which breaks the black box of the state. Agent-based models addressing the questions that arise on these levels can take a variety of shapes. We provide one line of thought on the set-up of an agent-based model for each of the two levels of analysis and discuss expected difficulties. Finally, we provide an outlook on how these aspects might come together in exploring how compliance rates can be bettered.

## Keywords

International Law, Compliance, Human Rights, Agent-based Modeling, European Court of Human Rights, Quantitative Legal Research, Qualitative Legal Research

## 1. Introduction

Recent years have seen important developments in methodological approaches in international and European legal scholarship. From quantitative to qualitative social sciences approaches, historical and anthropological perspectives, new methodologies have brought new insights into how international law and its actors operate. What remains unclear, however, is to what extent the existing methodologies can explain highly complex processes of state behavior relevant to international law. Such behavior evolves through time and depends on the action and cooperation of heterogeneous actors acting at different levels – from state representatives, government officials, NGOs and state organs, international institutions, etc. In this paper, we propose that agent-based modeling, which has been largely overlooked as a method for legal research, is suited to gather further insights into these processes and lead us to new discoveries.

We show the applicability of agent-based modeling using concrete problems in international legal research: the study of state compliance with European Court of Human Rights (ECtHR) judgments. Empirical research shows that despite the fact that judgments of the ECtHR are binding for all current 46 Council of Europe member states, more than half of its decisions remain unenforced. We show how ABM can contribute to a better understanding of state behavior and within state dynamics during the compliance process.

---

AMPM'21: First Workshop in Agent-based Modelling & Policy-Making, December 8, 2021, Vilnius, Lithuania

EMAIL: [katharina.luckner@uni-hamburg.de](mailto:katharina.luckner@uni-hamburg.de) (K. Luckner); [veronika.fikfak@jur.ku.dk](mailto:veronika.fikfak@jur.ku.dk) (V. Fikfak)

ORCID: 0000-0002-1508-0600 (K. Luckner); 0000-0003-0036-558X (V. Fikfak)



© 2021 Copyright for this paper by its authors.

Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

## 2. Compliance with the European Court of Human Rights

The European Court of Human Rights (ECtHR) is the chief institution of the Council of Europe for upholding the European Convention on Human Rights (ECHR). Since its inception in 1959, the Court has been facing an increasing case load with more than 40,000 new applications each year. The Court's main task is to determine whether a violation of a Convention right has occurred in any of the 46 Council of Europe member states, which have recognized the jurisdiction of the court. Although the Convention makes the judgments of the Court directly binding on the states, in practice more than half of all cases rendered by the court remain unenforced.

Decision making by the ECtHR and the subsequent implementation of judgments are highly complex processes, which include a wide range of actors. The most central – aside from Court and applicant (plaintiff) – is the Committee of Ministers (CM), which consists of representatives of all member states and is the institution which ultimately decides whether a country has complied with a judgment. Further complicating the process is the fact that when the Court rules a violation of the Convention has occurred, it only determines damages to be paid to the plaintiff, but remains silent regarding non-monetary remedies that the country has to undertake to rectify the situation which led to the human rights abuse in the first place (for a discussion of monetary damages within the ECHR system, see [1]). Instead, the country decides for itself which remedies are most suitable to rectify the situation, it then proceeds to implement the chosen remedies, and the CM signs off on whether the measures taken are sufficient (see for example [2]). This sets up a system that is fraught with the potential for self-serving behavior, trade-offs, and cop-outs in lieu of structural changes to better the human rights situation in Europe.

For the Human Rights Nudge Project, a multitude of key data on states' compliance with ECtHR judgments has been collected. Among that data are the type of violations raised in each case – e.g., the article of the European Convention on Human Rights that the state has (allegedly) breached; whether a judgment was complied with; the duration it took for a state to comply with the judgment; the damages awarded by the Court; the remedies chosen by the state to address the judgment. This data has been collected for the years 1980-2020. In addition, for a selected number of case studies, a thorough analysis of the actors and the networks that comprise the state's compliance apparatus was conducted. In the following, we will detail the insights gathered from this data, the questions that they leave unanswered, and how agent-based modeling might contribute to answering them.<sup>2</sup>

## 3. What can ABM contribute to compliance research?

### 3.1. Understanding state behavior: Temporal and spatial compliance patterns

When pulling together all instances of (non-)compliance between 1980 and 2020, in Figure 1, we see that the average compliance rate, i.e., the compliance rate averaged over all member states and plotted by year, shows a wave like development of compliance.

Notably, we see that these waves not only occur at times when many new states enter the European Convention of Human Rights (ECHR), i.e., they do not seem to solely be driven by new members to the ECHR. Zooming in, as Figure 2 does, it is evident that existing member states also contribute to the wave structure of compliance rates. The former might have a simple explanation: when a country joins the Convention and accepts the Court's jurisdiction, its internal practices may not (yet) be consistent with the Convention. Even if it is willing to address human rights abuses, the new state may not be able to increase its capacity to do so immediately, which impedes the implementation of subsequent ECtHR judgments. However, given that also established members contribute to the wave structure of compliance rates, this warrants a closer look.

---

<sup>2</sup> See [www.humanrightsnudge.com](http://www.humanrightsnudge.com) for more information. This data provides the basis for all following figures and graphs. For inquiries into data access, please contact [veronika.fikfak@jur.ku.dk](mailto:veronika.fikfak@jur.ku.dk).

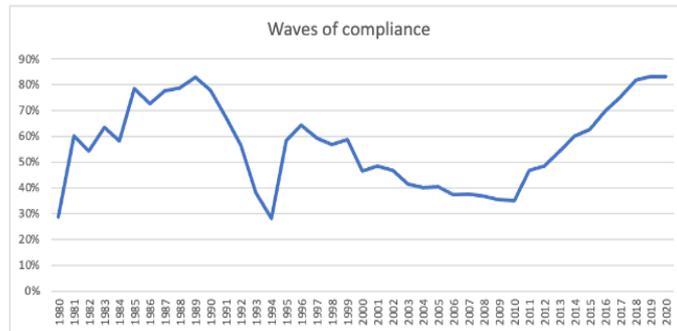


Figure 1. Average of all member states' compliance rates over time. Source: Human Rights Nudge Project.

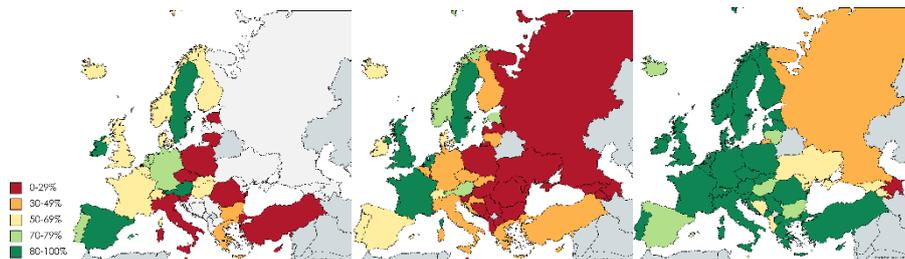


Figure 2. Compliance rates by country for the years 2000 (left), 2010 (middle), and 2020 (right). Source: Own Figure.

Figure 2 shows the compliance rates of (at the time) all member states of the European Convention on Human Rights in the years 2000, 2010, and 2020. Most of the new member states, which joined the Convention after 2000, have a very low compliance rate upon entering. Almost all of them steadily increase their compliance rates up until 2020. This is not the case for established member states, who in many cases exhibit decreased compliance before an overall increase in compliance towards the end of the observed period.

Empirical research has proven very useful for revealing different compliance patterns. The question that it mostly leaves open is what drives these compliance patterns. Some answers to this question can be given by case studies and through interviews with experts and practitioners. That, however, does not account for the scaling up of the compliance mechanisms and the interactions of decisions. ABM is especially useful here, as it can facilitate a more holistic view of the system, which connects individual behavioral theories and motivations with the overall outcome of many compliance processes running in parallel. We are currently investigating different behavioral assumptions for states within the ECtHR system to see how those affect compliance dynamics as states learn from each other and adapt strategies to deal with ECtHR judgments.

To do so, we plan to model states, cases, and the CM as agents. Each case signifies a certain violation of the law; if it is litigated, the court decides on its merits and sets the level of damages. The state, against whom the case is directed, decides to pay damages (or not) and assesses whether non-monetary remedies (like adoption of legislation) are appropriate to prevent future violations. The CM, which consists of representatives from all 46 member states, decides whether remedies are suitable and have been implemented sufficiently. Dependent variables are the selected set of remedies and whether the case has been closed (compliance) or not (non-compliance). Independent variables are the behavioral mechanisms which we aim to vary: (1) states adopt remedies randomly, (2) states imitate successful compliance processes of other states, with the potential reference group being neighbors or trade connections, etc., (3) in line with international relations theory on norm diffusion and norm entrepreneurship, states set expectations for their own compliance and that of others and police other states' behavior if necessary (for the latter, see for example [3, 4, 5]). We aim to see whether (and how) these micro behavior assumptions can reproduce the macro-outcomes of spatial compliance patterns and their development through time. This allows some conclusions about the behavior and dynamics that are at play within the human rights regime.

Taking state compliance with international court rulings, rather than state compliance with international law as the object of research, allows for concrete occasions and a timeline with discreet steps for state actors to make decisions, as well as providing a binary outcome variable, so that the application of the method seems well suited. Nevertheless, there are many limitations to be considered: chief among them is the fact that choosing behavioral theories and their concrete implementation in the model is notoriously difficult (see [6], for a discussion of this problem in socio-ecological systems), and here comes with the added difficulty of deciding which concepts are applicable to state behavior. Thus, we are facing a trade-off between parsimony and accurate representation.

Secondly, with this modelling agenda, we stay firmly within the research that assumes unitary state actors, which naturally misses a lot of nuances in how states react and how state behavior is internally conditioned. However, this is in line with much of current international law research on state compliance (not only with ECtHR judgements), so that we can contribute new insights at that level of abstraction. In the following, we take two aspects of internal state dynamics that are relevant to compliance and show how ABM might contribute insights there.

### **3.2. Breaking through the black box of the state: Compliance networks and the role of NGOs**

Conventional legal research methods provide insights into specific states' compliance apparatuses – and raise arguments that compliance depends on state capacity, rule of law index, state's GDP [7]. Network-analysis studies can further complement the picture by showing the specific network of actors at play in securing compliance: as has been shown on the example of Slovenia, the compliance apparatus within a country can have a great number of actors from different sectors: government institutions, government actors, non-governmental actors, media, etc. Figure 3 shows the network of actors for Slovenia [8]. The change of Slovenia's response to ECtHR judgments from a centralized reaction to a dispersed networked implementation of remedies was essential in increasing Slovenia's compliance record to a near-100 percent [8, p. 21].

Besides the governmental structure which reacts to ECtHR judgments, non-governmental organizations and actors are a central force in states' compliance with ECtHR judgments. Non-governmental organizations (NGOs) intervene in state compliance procedures via official channels and unofficial channels. The former are determined by Rule 9 of the *Rules of the Committee of Ministers for the supervision of the execution of judgments and of the terms of friendly settlements*. The latter may include media campaigns and the like, i.e., interventions which are not governed by legal provisions within the ECHR. Empirical investigations show the effect of NGO Rule 9 interventions on the decision making of the CM and the Execution Department, the body supporting the CM, respectively [9], the different strategies that Human Rights NGOs use when intervening in open judgments and states' reactions to those interventions [10], as well as when NGOs intervene in the first place, and against whom [11]. According to one study, NGOs predominantly intervene against good compliers, suggesting that this has the highest chances of success for the NGO [11]. Expanding the dataset on compliance, however, shows competing evidence [12]. It is also not clear how NGOs chose their intervention strategy and whether they change it over time.

We are currently investigating the dynamics of NGO intervention in compliance procedures [12]. Translating the legal provision, and what we have learned from interviews with NGOs into formal behavioral prescriptions (“when and how to intervene”, barriers to interventions), we want to see how different types of NGOs, differentiated by their location and funding source(s) most optimally choose their interventions in the short, medium, and long term. The model consists of NGOs and states; the central drivers of behavior are funding (for the NGOs) and reputation (for states and NGOs). We assume that there is a trade-off between funding and reputation, but also an interaction effect of this trade-off with the type of intervention (constructive or destructive). Given NGOs' need for long-term survival and continued funding, which intervention strategies should they use, and which states should they target – say good or bad compliers, for example – to maximize their impact? In a second step, we aim to relax behavioral assumptions away from a rational choice paradigm, as well as include NGO networks, and learning effects among NGOs.

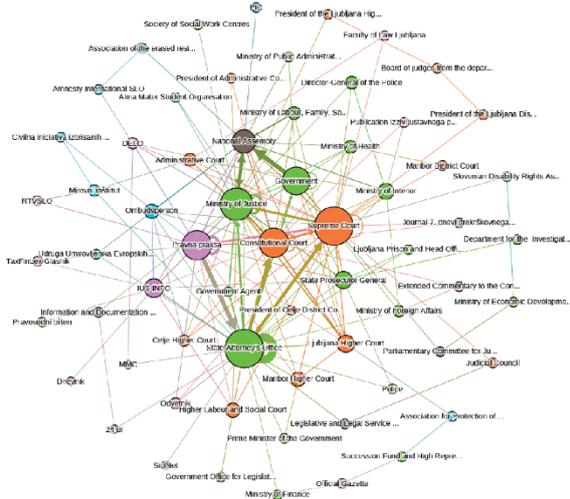


Figure 3. Compliance actors in Slovenia. Colors indicate sector: government (grey for the legislative branch, green for the executive branch, orange for the judicial branch), media (purple), civil society (blue). Edges denote temporal rather than causal connections; size of nodes is proportional to the number of times that a specific actor was active in an implementation procedure. Graph is based on all cases rendered against Slovenia and is reproduced from Source: [8, p. 23].

A number of problems arise from this set-up, chiefly perhaps the definition of what constitutes a successful intervention – it is difficult to assess the contribution that an NGO has made to the compliance process, and correspondingly difficult to translate it into traceable model outcomes. Secondly, the translation of qualitative research (interviews, text analysis) and legal norms into mechanisms within the model presents a challenge, which is well-documented and has been tackled for other fields of application [13, 14, 15].

#### 4. Conclusion and Outlook

We use the case of states' compliance with ECtHR judgments and the empirical work on the subject as an example to show how agent-based modeling could be a beneficial addition to the international legal scholarship toolbox. Not only can it help us understand observable (non-) compliance patterns better, it can also provide insights into the state apparatus that lead to such patterns and the role that non-state actors have in the compliance process.

Eventually, understanding states' behavior, and how it depends on their relative location, past behavior and internal compliance apparatus should help us in determining potential remedies for poor compliance performances within the European Human Rights regime. Studies have suggested different approaches to such remedies – from sanctioning states to the use of rewards (for a comprehensive discussion of "carrots and sticks" in international relations, see [16], [17]; for an argument for rewards in international law, see [18]). However, as with any policy making effort, it is unclear which remedies, or mix thereof, would be the most effective, and which unintended consequences the international community would have to face. These difficulties have been tackled with the help of ABM in areas ranging from policies for refugee support [19], [20], fiscal policy [21] and agricultural policy [22].

Drawing on the literature on agent-based modeling for policy making and its pitfalls (see for example, [23]), in the future, interventions for increasing state compliance could be designed and tested. Those studies which we sketched above would give us an understanding of the relevant factors within compliance dynamics, which could then be varied systematically on order to understand the comparative effects of different interventions on compliance rates while keeping all else constant. Understanding the interdependencies of state behavior might also enable us to make more detailed recommendations about norm nudges and allow us to use sociological studies on normative change and norm entrepreneurs (see [3] and [5] respectively) in the international realm. This could provide novel insights for stakeholders and policy makers on how to alter rules and regulations to increase compliance rates and hopefully decrease human rights violations over time.

## 5. Acknowledgements

The work on this article was funded by the European Research Council («ERC Human Rights Nudge» 803981). Additionally, KL is undertaking her PhD research, which this project is a part of, at the Humboldt Chair for Law and Economics, Legal Theory, Public International Law and European Law at the Institute of Law and Economics, University of Hamburg.

We thank the organizers and participants of the AMPM Workshop at the JURIX 2021 Conference, as well as three anonymous reviewers, for helpful comments and suggestions.

## 6. References

- [1] V. Fikfak, Changing State Behaviour: Damages before the European Court of Human Rights, *European Journal of International Law* 29 (2018) 1091–1125. doi: 10.1093/ejil/chy064.
- [2] V. Fikfak, Non-pecuniary damages before the European Court of Human Rights: Forget the victim; it's all about the state, *Leiden Journal of International Law* 33 (2020) 335–369. doi: 10.1017/S0922156520000035.
- [3] C. Bicchieri and E. Dimant, Nudging with care: the risks and benefits of social information, *Public Choice* (2019). doi: 10.1007/s11127-019-00684-6.
- [4] C. Elsenbroich and G. N. Gilbert, *Modelling norms*. Springer, Dordrecht/Heidelberg/New York/London, 2014.
- [5] M. E. Keck and K. Sikkink, *Activists beyond borders*. Cornell University Press, Ithaca, 1998.
- [6] Schwarz, N., Dressler, G., Frank, K., Jager, W., Janssen, M., Müller, B., Schlüter, M., Wijermans, N., & Groeneveld, J., Formalising theories of human decision-making for agent-based modelling of social-ecological systems: practical lessons learned and ways forward, *Socio-Environmental Systems Modelling* 2 (2020) 16340–16340. doi: 10.18174/sesmo.2020a16340.
- [7] S. Grewal and E. Voeten, Are New Democracies Better Human Rights Compliers?, *International Organization* 69 (2015) 497–518. doi: 10.1017/S0020818314000435.
- [8] V. Fikfak and U. Kos, SLOVENIA - AN EXEMPLARY COMPLIER WITH JUDGMENTS OF THE EUROPEAN COURT OF HUMAN RIGHTS? Compliance and ECtHR - Country Report, 2021. <http://dx.doi.org/10.2139/ssrn.3801105>.
- [9] E. Erken, Non-Governmental Organisations and National Human Rights Institutions monitoring the execution of Strasbourg Judgments: An Empirical Perspective on Rule 9 Communications, *Human Rights Law Review* 21 (2021) 724–751. doi: 10.1093/hrlr/ngab007.
- [10] A. Küçüksu, Enforcing Rights Beyond Litigation: Mapping HRO Strategies in Monitoring ECtHR Judgment Implementation, *Enforcing Rights Beyond Litigation: Mapping HRO Strategies in Monitoring ECtHR Judgment Implementation*. *Human Rights Law Review*, forthcoming. doi: 10.2139/ssrn.3945564.
- [11] S. Dothan, A Virtual Wall of Shame: The New Way of Imposing Reputational Sanctions on Defiant States, *Duke Journal of Comparative and International Law* 27 (2017) 141–190.
- [12] V. Fikfak, A. Küçüksu, and K. Luckner, Mapping NGO behavior before the ECtHR, forthcoming.
- [13] S. Moss and B. Edmonds, Sociology and Simulation: Statistical and Qualitative Cross-Validation, *American Journal of Sociology* 110 (2005) 1095–1131. doi: 10.1086/427320.
- [14] T. A. Schenk, Using stakeholders' narratives to build an agent-based simulation of a political process, *SIMULATION* 90 (2014) 85–102. doi: 10.1177/0037549713514127.
- [15] L. Yang and N. Gilbert, Getting away from numbers: using qualitative observation for agent-based modeling, *Advs. Complex Syst.* 11 (2008) 175–185. doi: 10.1142/S0219525908001556.
- [16] G. Dari-Mattiacci and G. DeGeest, Carrots vs. Sticks, *The Oxford Handbook of Law and Economics*, 2017.
- [17] N. Ridi and V. Fikfak, Sanctioning to Change State Behaviour, *Journal of Dispute Settlement*, forthcoming 2022. <http://dx.doi.org/10.2139/ssrn.4063662>.
- [18] A. vanAaken and B. Simsek, Rewarding in International Law, *American Journal of International Law* 115 (2021).

- [19] J. G. Anderson, A. R. Chaturvedi, Mike Cibulskis, and M. Cibulskis, Simulation tools for developing policies for complex systems: Modeling the health and safety of refugee communities, *Health Care Management Science* 10 (2007) 331–339. doi: 10.1007/s10729-007-9030-y.
- [20] Gore, R., Wozny, P., Dignum, F., Shults, F. L., van Burken, C., Burken, C. B., & Royakkers, L. M. M., A Value Sensitive ABM of the Refugee Crisis in the Netherlands, 2019 Spring Simulation Conference (SpringSim), 2019, doi: 10.23919/springsim.2019.8732867.
- [21] T. Assenza, P. Colzani, D. Delli Gatti, and J. Grazzini, Does fiscal policy matter? Tax, transfer, and spend in a macro ABM with capital and credit, *Industrial and Corporate Change* 27 (2018) 1069–1090. doi: 10.1093/icc/dty017.
- [22] D. Kremmydas, I. N. Athanasiadis, and S. Rozakis, A review of Agent Based Modeling for agricultural policy evaluation, *Agricultural Systems* 164 (2018) 95–106. doi: 10.1016/j.agsy.2018.03.010.
- [23] B. Edmonds and L. ní Aodha, Using Agent-Based Modelling to Inform Policy – What Could Possibly Go Wrong?, In P. Davidsson & H. Verhagen (Eds.), *Multi-Agent-Based Simulation XIX*, Springer International Publishing, pp. 1–16. [https://doi.org/10.1007/978-3-030-22270-3\\_1](https://doi.org/10.1007/978-3-030-22270-3_1).