

**Recent Trends in International Environmental Agreements: Declining or What?**

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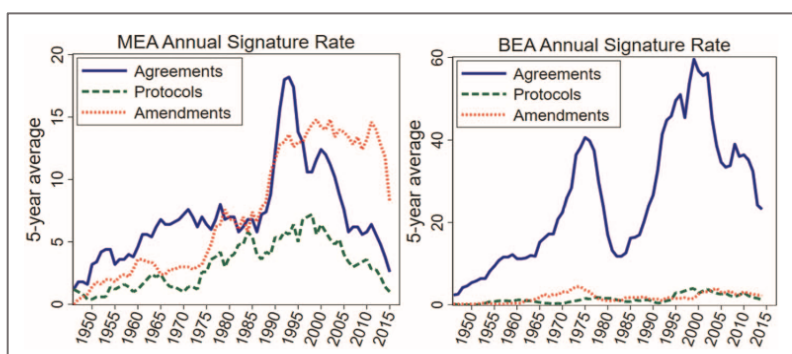
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## Introduction

International environmental agreements (IEAs) have been an important aspect of environmental issues and conflicts over resources around the world.<sup>1</sup> Major global environmental problems have been addressed by international treaties such as the Montreal Protocol's capability to reduce pollution affecting the ozone layer and the Paris Agreement which is a legally binding agreement regarding emissions.<sup>2</sup> As climate change becomes a larger issue on the global stage and transnational environmental problems are increasing, have trends in IEAs reflected that change? Previous studies have assumed that IEAs are generally on the rise, but no studies have paid attention to recent trends using numerical data. This study analyzes the International Environmental Agreements Database (IEADB), a publicly available dataset created and managed by the University of Oregon. The purpose of this study is (1) to see if IEAs are on the rise and reflect the increasing global/transnational environmental problems and (2) to demonstrate how specificities like the agreement type, subject, and member countries have shifted over time, all important insights to fully understanding how IEAs are formulated, implemented, and their effectiveness.

### IEAs on the Rise?

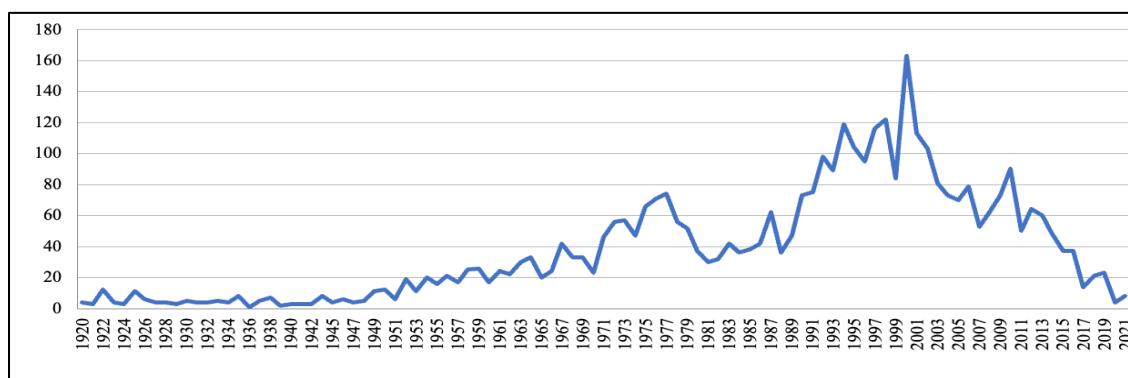
IEAs have been vastly studied, but the existing studies focused on the stability of the agreements<sup>3</sup> and the member states' compliance with the agreements from an international law perspective.<sup>4</sup> The trends of IEAs have not been investigated as deeply. This may have largely been due to the lack of a database solely focused on IEAs. Mitchell who had iterated the need for a comprehensive database on IEAs that would allow a larger level of analysis and more understanding of the formation, negotiation, and effectiveness of IEAs,<sup>5</sup> have created with colleagues at the University of Oregon the IEADB that provides a cumulative account for all IEAs while breaking them down by agreement type, subject, member countries, and more.<sup>6</sup> In an article accompanying the IEADB, Mitchell and colleagues described the dataset and provided their own analysis of the identified IEAs.<sup>7</sup> They argued that states sign new agreements more often than modifications such as protocols and amendments and that the number of states participating in IEAs has sharply increased.<sup>8</sup> Figure 1, which has been captured from the article, was to show the increasing number of IEAs.



*Figure 1. 'Rates of Successfully Completed IEA Negotiations' from Mitchell, et. al (2020) Article.*

In our efforts to replicate this study, however, we used a wider timeline and found that the number of IEAs increased only until the early 2000s and has clearly decreased since then. Figure 2 illustrates this trend. In 2000, IEAs peaked at a total of 163 agreements, but has been

declining since then. To understand why the international environmental agreements have been decreasing since the early 2000s, we went back to the IEADB and analyzed the agreements, their legal status, agreement types, member countries, and subjects.



*Figure 2. The Total Number of IEAs Over Time*

### Analysis of IEAs

The IEADB includes 3,860 IEAs and provides distinct criteria for its inclusion. First of all, the agreement had to be regarding the environment in which member states seeks, “as a primary purpose, to manage or prevent human impacts on natural resources; plants and animal species (including in agriculture, since agriculture modifies both); the atmosphere; oceans; rivers; lakes; terrestrial habitats; and other elements of the natural world that provide ecosystem services”.<sup>9</sup> The agreements also need to meet the criteria of the 1969 Vienna Convention on the Law of Treaties which states that a treaty is “an international agreement concluded between States in written form and governed by international law” and that the agreement must also include a state’s expression of “consent to be bound.”<sup>10</sup> The IEADB also distinguished between agreements between two states (Bilateral Environmental Agreement, BEA) and agreements of three or more states (Multilateral Environmental Agreement, MEA).<sup>11</sup> We utilized this information and investigated the reasons for this recent decline. We also looked for any emerging trends that may explain this decline.

#### *Finding 1: Bilateral vs Multilateral Agreements*

Our first significant finding, shown in Figure 3, is that more and more countries are participating in multilateral agreements than bilateral agreements. Multilateral agreements are those between three or more member countries while bilateral agreements are between only two member countries. The number of multilateral agreements has not been declining, at least as fast as, bilateral agreements. Figure 3 also shows that the peak of IEAs in 2000, came largely from a spike in bilateral agreements. After this peak, the total number of IEAs decreased similarly to bilateral IEAs, while multilateral IEAs remained relatively stable.

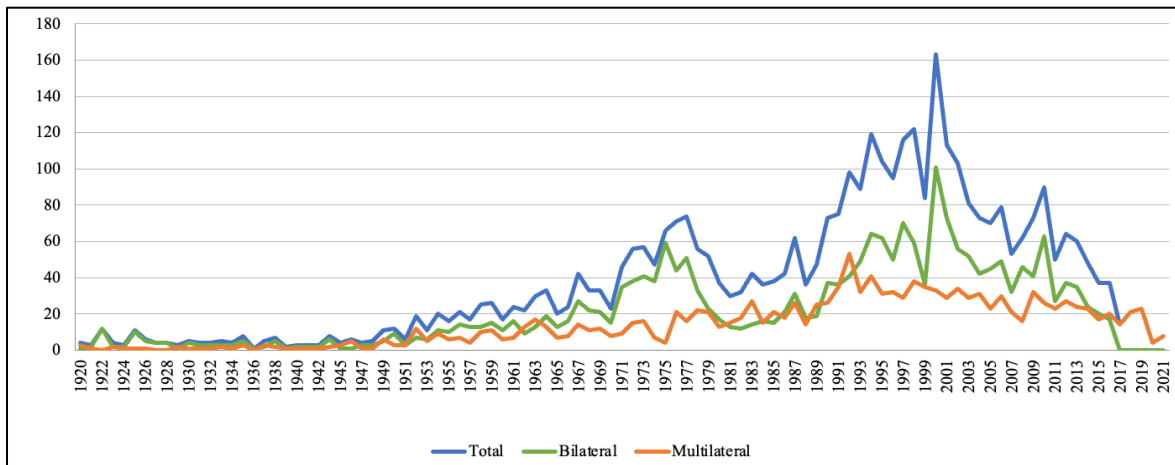


Figure 3. The Number of IEAs Over Time by Agreement Type

Figure 4 demonstrates the breakdown of IEAs by their agreement type since 2000 to better present the relative stability of multilateral agreements compared to the decline of bilateral IEAs. This may mean that bilateral treaties have been replaced by multilateral treaties as environmental issues have been globalized and the interests among countries have converged.

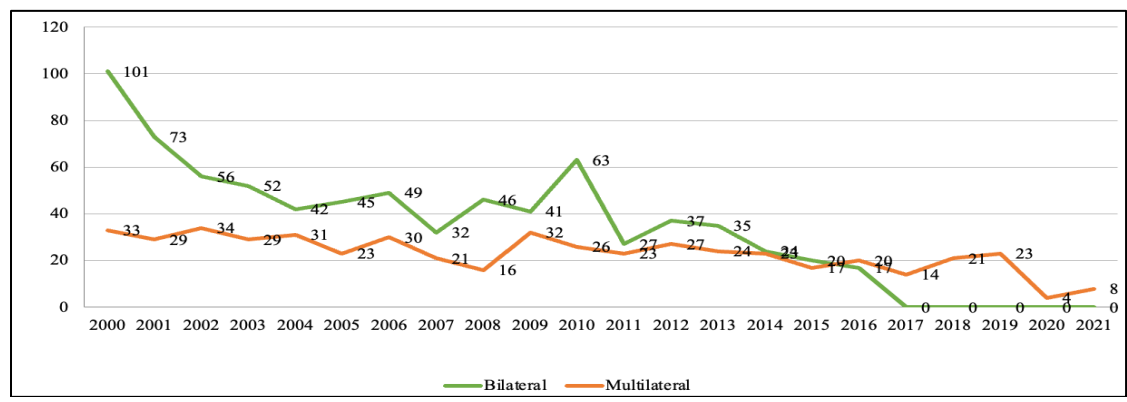
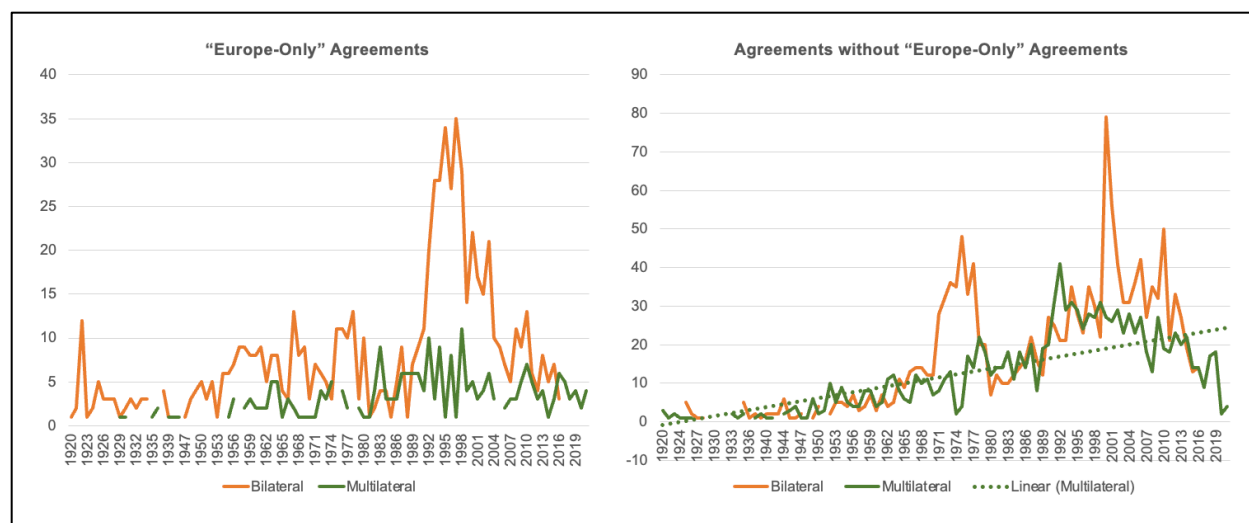


Figure 4. The Number of IEAs by Agreement Type Since 2000

Finding 2: “Europe-Only” vs “non-Europe Only”

While doing our analysis for the previous section, we found that many bilateral agreements were made among European countries. To confirm this idea and to better understand the nature of bilateral and multilateral agreements, we coded all the agreements by their member countries and by which continents those member countries are within. Then, we distinguished between “Europe-only” agreements and “non-Europe-only” agreements. As presented in Figure 5, bilateral IEAs between European countries only peaked in 1997 at 35 agreements and have decreased since, an earlier decline than the overall trend of IEAs. Multilateral IEAs between only European member countries have been relatively stable.

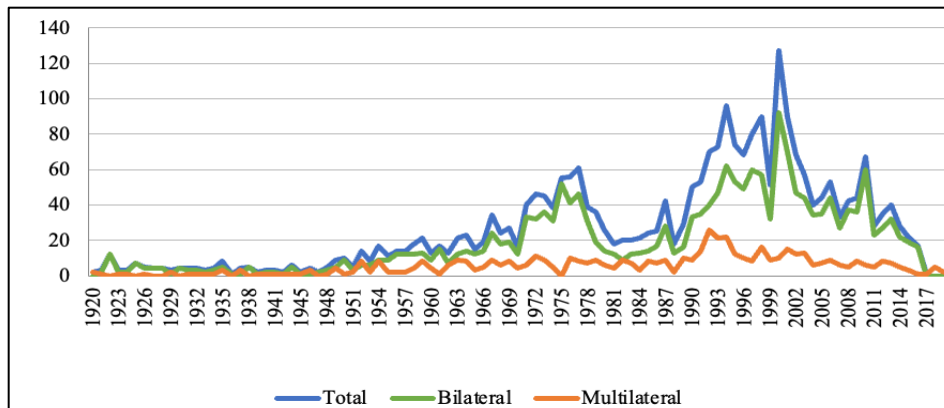


**Figure 5. “Europe-Only” Agreements and “Non-Europe-Only” Agreements**

“Non-Europe-only” agreements, however, showed that bilateral agreements are decreasing but multilateral agreements are on an upward trend. The graph on the right shows that bilateral agreements including non-European member countries peaked in 2000 at 79 IEAs and have decreased since, differing from the peak of agreements between European only member countries in 1997. Multilateral agreements including non-European countries peaked in 1992 at 41 agreements and have been slightly declining since, but the overall linear trend of multilateral agreements including non-European countries has been slightly increasing. This represents two trends: (1) more non-European countries have made multilateral environmental agreements, and (2) even bilateral agreements moved to outside the European continent. Moreover, multilateral IEAs showed varying rates with relatively large spikes in 1992 and 1997. These years had totals of over 2,900 countries participating in different agreements. 1992 and 1997 also had significant multilateral IEAs signed, such as the United Nations Framework Convention on Climate Change in 1992 with 197 member countries and in 1997, the Protocol to the United Nations Framework Convention on Climate Change, also known as the Kyoto Protocol, with 194 member countries and an Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer with 196 member countries.

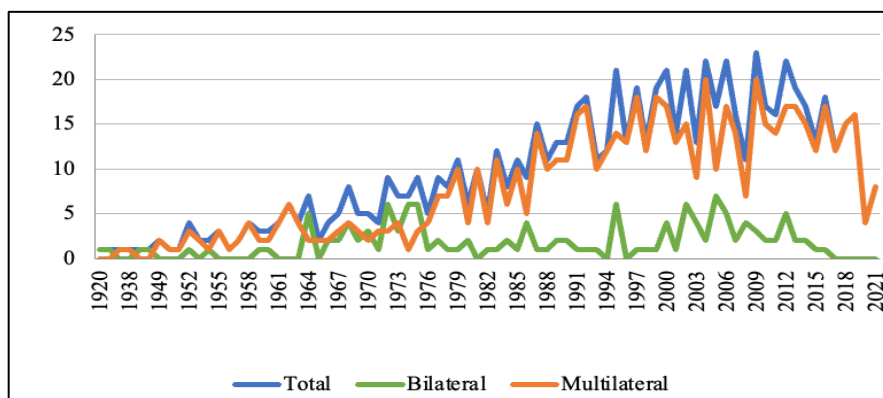
### *Finding 3: Legal Status: New Agreements, Amendments, and Protocols*

Another significant finding focused on the legal status of the agreements found in the IEADB which placed each agreement into one of three categories: new agreements, amendments, and protocols. In Figure 6, new IEAs peaked in 2000 with 127 new agreements and have decreased since, similar to the overall trend of IEAs. This peak was largely due to bilateral agreements. In 2000, 32 of these bilateral IEAs included Germany and focused on certain bilateral projects between Germany and other foreign governments. For example, one of these IEAs was the ‘Arrangement between the Government of the Federal Republic of Germany and the Government of the People's Republic of China concerning technical cooperation in the project 'Improvement of Animal and Plant Quarantine'. There was a slight peak in new multilateral IEAs in 1992, but there has been a slight decline since then.



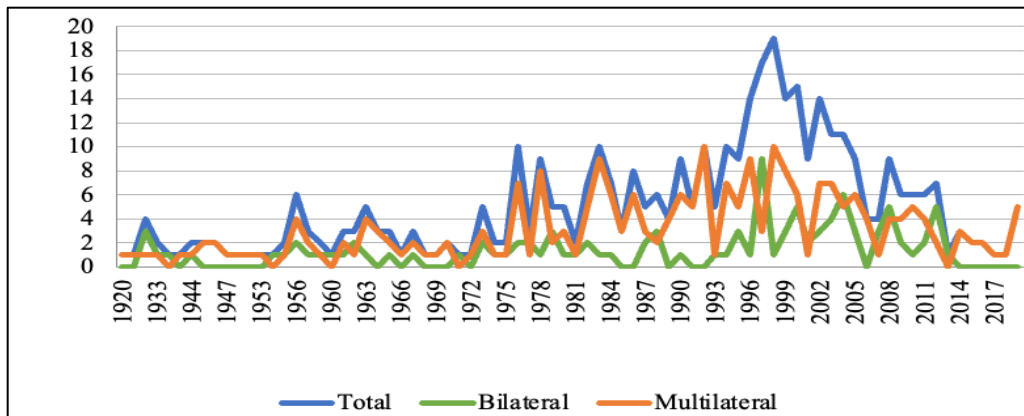
*Figure 6. New Agreements by Agreement Type*

Amendments of pre-existing IEAs have been on a steady upward trend with most amendments being made to pre-existing multilateral agreements as seen in Figure 7. There was a sharp decline in 2020 with only four amendments in that year, but this was likely due to the global impact of COVID-19 pandemic. Overall, amendments of pre-existing agreements have been on an upward trend which indicates that the international community is not just discontinuing conversations on the environment, but rather amending already existing agreements.



*Figure 7. Amendments to Existing Agreements by Agreement Type*

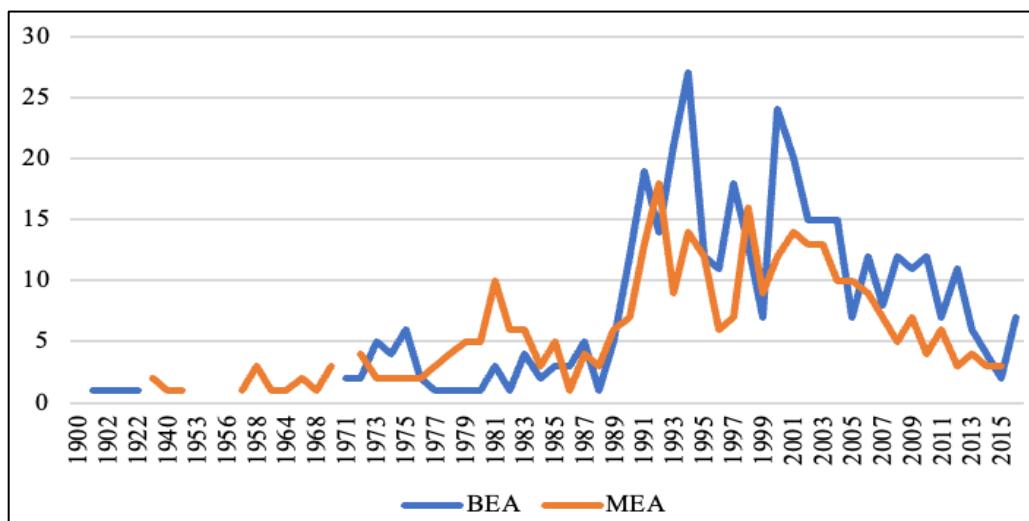
In Figure 8, the total number of protocols has been declining with a slight decline in both, bilateral and multilateral protocols. Protocols are minor amendments adding some new components to the existing agreements. Protocols peaked in 1998 with a total of 19 protocols that year and has decreased since. In summary, new agreements and protocols have shown ups and downs, but amendments (i.e., major changes) to existing agreements have been on an upward trend.



*Figure 8. Adding Protocols to the Existing Agreements by Agreement Type*

*Finding 4: Different Trends by Subject*

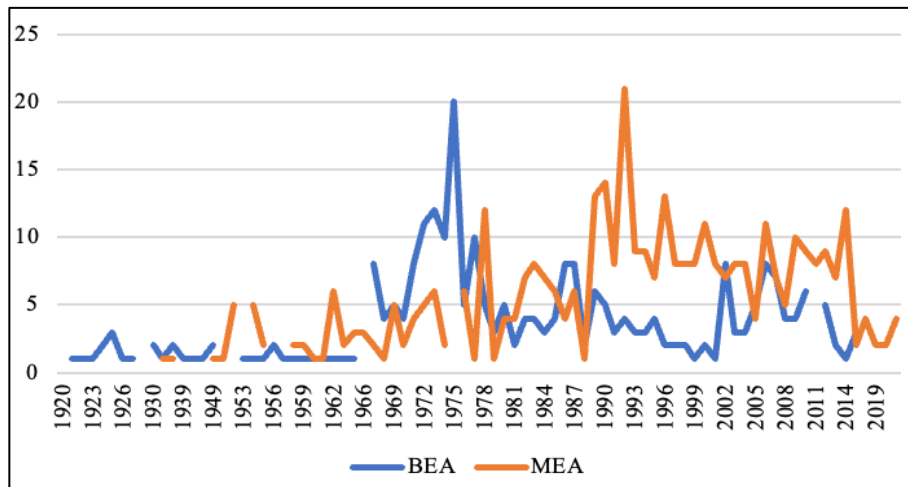
Our last finding was in regard to the subject of each IEA. Each agreement had at least one subject, although many agreements had multiple subjects, assigned by the IEADB. Therefore, we recoded each agreement to account for their subjects to sort them by subject. The first subject of IEAs we analyzed was “nature.” The IEADB defines an agreement regarding nature if it is “related to efforts to conserve, manage, preserve, and protect natural resources, natural systems, and wilderness or to foster sustainable development”.<sup>12</sup> In Figure 9, we see that multilateral IEAs regarding nature peaked in 1992, but have been declining since. In 1992, one of the prominent agreements signed regarding nature was the North American Free Trade Agreement which would be the first U.S.-signed free trade agreement to include environmental provisions.<sup>13</sup> Bilateral IEAs regarding nature would not peak until 1994 and then again in 2000 but has declined since.



*Figure 9. IEAs Regarding “Nature” by Agreement Subject*

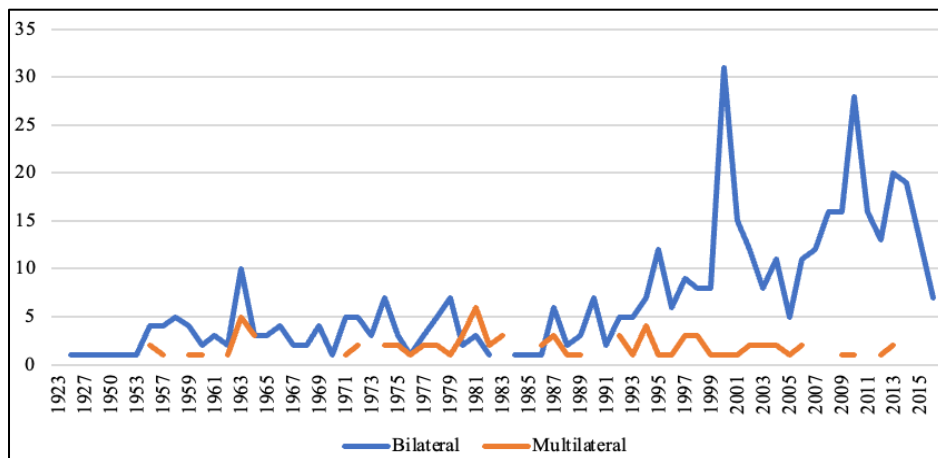
The second subject of IEAs we analyzed was specific to the protection of the “ocean.” The IEADB defines these agreements as “related to ocean exploration and ocean science”.<sup>14</sup> In Figure 10, there is a shift from bilateral IEAs to multilateral IEAs between 1975 and 1992. In

1975, nine of the twenty bilateral IEAs signed that year regarding the ocean were between the Soviet Union and the U.S. or Canada regarding fisheries. The cause of the shift to multilateral IEAs after 1975 is unknown and should be studied further.



*Figure 10. IEAs Regarding the “Ocean” by Agreement Subject*

The third subject we analyzed was “energy.” The IEADB regards an IEA as relating to energy if it “[addresses] energy production, including nuclear energy”.<sup>15</sup> IEAs regarding energy have largely relied on bilateral agreements due to these agreements often resolving a conflict over resources between two countries. In Figure 11, bilateral agreements regarding energy peaked in 2000 with a total of 31. In 2000, these bilateral agreements regarding energy varied in subject, but a majority of them discussed specifically peaceful uses of nuclear energy, a prominent topic of the international stage.

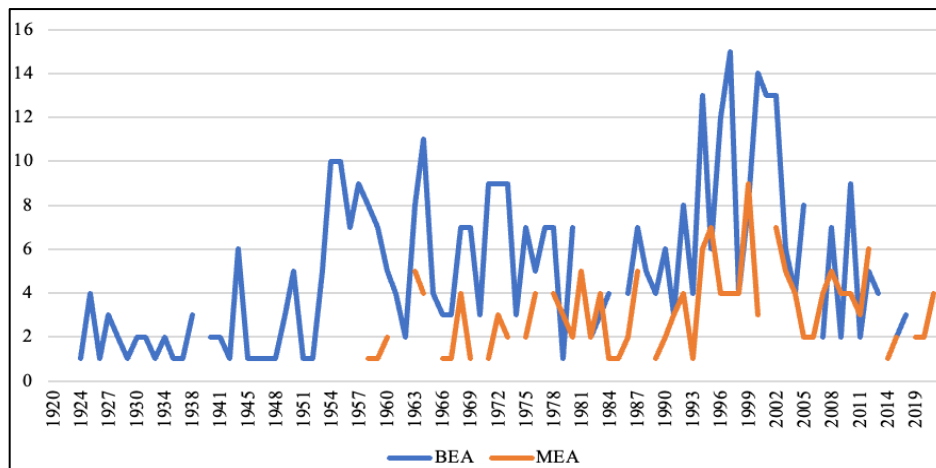


*Figure 11. IEAs Regarding “Energy” by Agreement Subject*

The fourth subject we examined was regarding “freshwater resources.” The IEADB defines IEAs about freshwater resources as those related to “regulation of lakes and rivers”.<sup>16</sup> Similar to IEAs regarding energy, as shown in Figure 12, most freshwater resource IEAs rely on

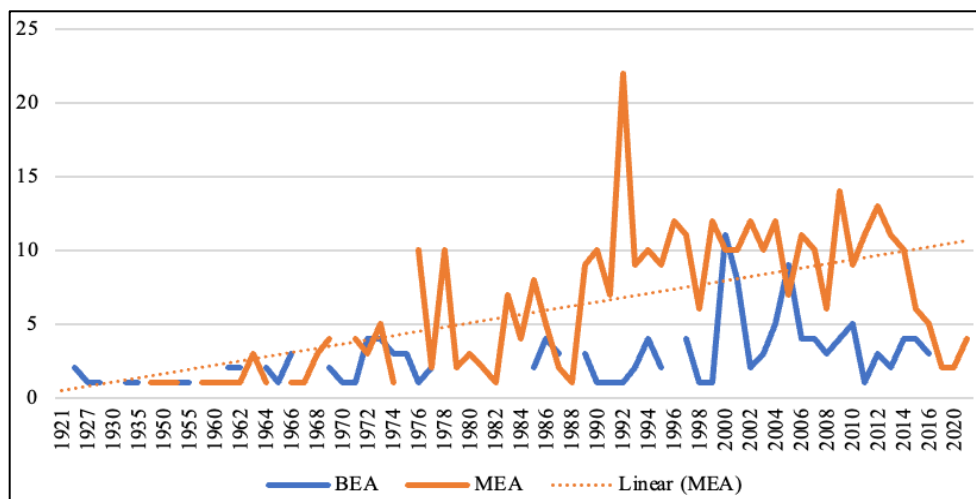


bilateral agreements because they focus on resource conflicts between two countries. Bilateral IEAs regarding freshwater resources peaked in 1997 and have declined since.



*Figure 12. IEAs Regarding “Freshwater Resources” by Agreement Subject*

The fifth subject we analyzed is “pollution.” The IEADB defines these agreements as those “related to all forms of pollution, whether affecting air, land, oceans, or freshwater systems at regional or global scales”.<sup>17</sup> In Figure 13, multilateral agreements peaked in 1992 with a total of 22 multilateral IEAs signed that year but have remained on an upward trend since. Nine of those 22 multilateral IEAs signed in 1992 were specifically regarding marine pollution.



*Figure 13. IEAs Regarding “Pollution” by Agreement Subject*

The final subject we analyzed was “species”-related agreements, as shown in Figure 14. This topic includes agreements related to “protecting or managing human interactions with plant and animal species”, as defined by the IEADB.<sup>18</sup> Bilateral species-related agreements are more common than multilateral species-related agreements because they are related to a resource conflict between two countries, especially fisheries. Bilateral species-related agreements peaked

in 1975 and again in 2000. In 1975, 17 of those agreements included the Soviet Union and specifically discussed fishing in the Pacific Ocean.

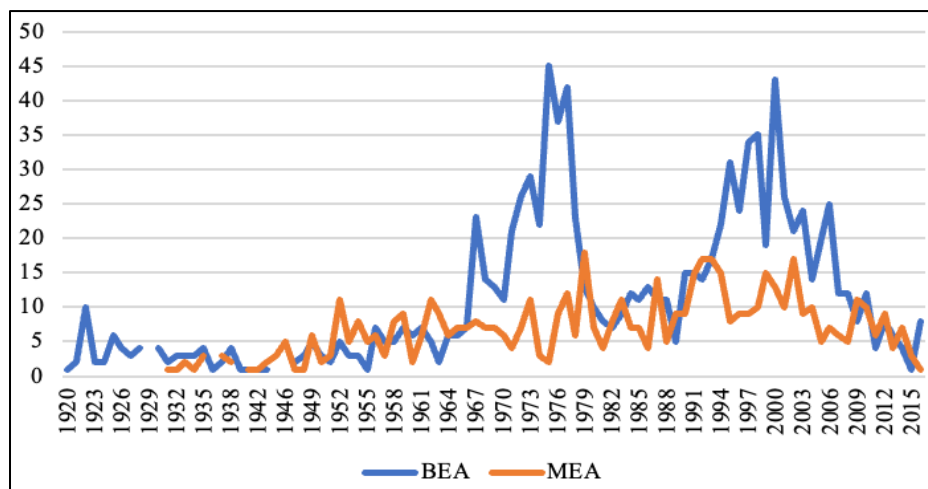


Figure 14. IEAs Regarding "Species" by Agreement Subject

## Discussion & Conclusion

This study has four significant findings regarding the trends of IEAs. First, the total number of IEAs have been declining since the early 2000s, but this decline is largely due to a decline in bilateral IEAs. Multilateral IEAs have been relatively stable compared to the decline in bilateral IEAs. Since bilateral IEAs are commonly used to resolve a specific resource conflict between two countries, this finding may suggest that these resource conflicts have been declining. The stability of multilateral IEAs may support that discussion of the environment within the international community is being maintained, but this also shows that discussion is not increasing even as the effects of climate change become more prominent. Second, this study distinguished between agreements that were made between European countries and agreements that include non-European countries and found that more non-European countries have joined multilateral environmental agreements and that even the center of bilateral agreements moved from Europe to other different regions. Third, while the overall number of new IEAs have been declining, the number of amendments to pre-existing IEAs have actually been increasing. This finding could mean that as resolutions are met, countries are simply revising the original solution to be more efficient, thus still maintaining the discussion of the environment within the international community. Amendments may become more prominent in the international community as negotiations and bargaining may be simpler than creating an entirely new agreement. The fourth finding shows how the subjects of these IEAs varied and should each be studied further to better understand how these trends reflect interactions in the international community. The subjects often varied because certain subjects tend to be bilateral in nature while others are multilateral in nature. For future research, these trends should be compared to the effectiveness of IEAs in each subject. This would allow for adjustments and recommendations to be applied to subjects that are facing adversity and are often not impacted by IEAs.

Studying the trends of IEAs can allow us to understand how environmental conflicts or issues can be resolved through international law. Trends in IEAs often reflect recent prior conflicts such as the spike in bilateral agreements regarding the ocean in 1975. This spike in bilateral IEAs reflected a recent conflict between the Soviet Union and Canada involving fishing

in the Pacific Ocean. Several of the bilateral IEAs signed in 1975 regarding the ocean are a resolution to this conflict between the Soviet Union and Canada.<sup>19</sup> While these trends show us vast information about IEAs, future research should use these trends to better understand the impact or effectiveness of IEAs. Future research should also consider the impact of international interactions in the creation and implementations of IEAs to better understand the formation of IEAs. The trends of IEAs can also show how international discussions on the environment formulate into international law. Governments consider a host of factors when deciding whether they will enter into, negotiate, or join an IEA. Understanding the trends of IEAs can help us better understand the condition and types of agreements governments choose to participate in depending on the environmental issue at hand. This understanding can also be used in evaluating the effectiveness of IEAs based on their content and structure. All of this information will assist policy makers in developing effective and appealing IEAs that will address future environmental issues as well as act as an advising tool for creating amendments and protocols for current IEAs should they be necessary.

## Notes

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- <sup>1</sup> See Carraro, C., & Siniscalco, D. (1998). International institutions and environmental policy: international environmental agreements: incentives and political economy. *European economic review*, 42(3-5), 561-572.
- <sup>2</sup> Velders, G. J., Andersen, S. O., Daniel, J. S., Fahey, D. W., & McFarland, M. (2007). The importance of the Montreal Protocol in protecting climate. *Proceedings of the National Academy of Sciences*, 104(12), 4814-4819.
- <sup>3</sup> For example, Diamantoudi, E., & Sartzetakis, E. S. (2006). Stable international environmental agreements: An analytical approach. *Journal of public economic theory*, 8(2), 247-263; Vollenweider, J. (2013). The effectiveness of international environmental agreements. *International Environmental Agreements: Politics, Law and Economics*, 13(3), 343-367.
- <sup>4</sup> For example, Cherry, T. L., & McEvoy, D. M. (2013). Enforcing compliance with environmental agreements in the absence of strong institutions: An experimental analysis. *Environmental and Resource Economics*, 54(1), 63-77; Weiss, E. B. (1998). Understanding Compliance with International Environmental Agreements: The Baker's Dozen Myths. *U. Rich. L. Rev.*, 32, 1555.
- <sup>5</sup> Mitchell, Ronald B. 2003. "International Environmental Agreements: A Survey of Their Features, Formation, and Effects." *Annual Review of Environment and Resources*, 28: 429-461.
- <sup>6</sup> International Environmental Agreements Database Project (Version 2020.1). Data publicly available at <http://iea.uoregon.edu/>.
- <sup>7</sup> Mitchell, R. B., Andonova, L. B., Axelrod, M., Balsiger, J., Bernauer, T., Green, J. F., ... & Morin, J. F. 2020. "What we know (and could know) about international environmental agreements." *Global Environmental Politics*, 20(1): 103-121.
- <sup>8</sup> Mitchell, Andonova, et. al, 2020.
- <sup>9</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>10</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>11</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>12</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>13</sup> Congressional Research Service. 2022. "Environmental Provisions in Free Trade Agreements (FTAs)." *Congressional Research Service Reports*. Available from <https://crsreports.congress.gov/product/pdf/IF/IF10166>
- <sup>14</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>15</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>16</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>17</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>18</sup> See the detailed criteria at <http://iea.uoregon.edu/>.
- <sup>19</sup> The New York Times. 1975. "Canada's Fishing Dispute With Soviet Is Resolved." *New York Times*. Available from <https://www.nytimes.com/1975/09/27/archives/canadas-fishing-dispute-with-soviet-is-resolved.html>