



Governing the Global Commons

Lessons Learned from Outer Space and International Waters

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How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty?

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Summary

The Moon Treaty of 1979 governs activities on the moon and other celestial bodies and is widely regarded as a failed treaty due to its low ratification rate, which in existing literature is explained by the treaty's application of the common heritage of mankind principle to the natural resources of outer space. The common heritage of mankind principle is a concept in international law that broadly entails that territorial areas and elements beyond the limits of national jurisdictions cannot be appropriated and should be used for peaceful purposes only and to the benefit of all. Another treaty that applies this principle is the Law of the Sea Treaty of 1982, which governs activities in international waters and unlike the Moon Treaty, is ratified by the vast majority of countries in the world. Due to the similar nature of the treaties (i.e. both treaties concern the governance of global commons), this discrepancy requires further analysis.

My thesis aims to explain the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty by looking at conditions for international cooperation, using a congruence analysis approach. As international relations (IR) theory offers insights into the rationales for cooperation between states, I use two divergent IR theories – realism and liberal institutionalism – for my analysis. For each school of thought, six assumptions about cooperation are formulated, which are used to determine the level of explanatory value of each theory for the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty. The assumptions identified for realism concern relative gains, balance-of-power threat, common threat, hegemon participation, high/low politics, and competition control. The assumptions identified for liberal institutionalism concern absolute gains, transaction costs, institutional participation, legal framework demand, information demand, and hegemonic decline. The findings of my research conclude that realist theory and liberal institutionalist theory provide equal explanatory value for the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty.

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1 Introduction

In 2009, scholar Fabio Tronchetti predicted that “due to significant developments and innovations in space technologies and launch vehicles, as well as to the renewed interests of countries in the moon and its resources, the day on which the exploitation of the materials present on the lunar and other celestial bodies’ surface will start, is approaching fast” (Tronchetti, 2009). Developments in recent years prove he was right, particularly the actions undertaken by a multitude of countries in relation to space mining and the development of appropriate space laws.

In 2015, former United States (U.S.) President Barack Obama signed the U.S. Commercial Space Launch Competitiveness Act, granting U.S. citizens the right to commercially exploit resources in space and allowing them to possess, own, transport, use and sell the asteroid or space resource (Fox, 2016, p. 175), a move applauded by asteroid mining company Planetary Resources and multiple Congressmen (“President Obama Signs Bill Recognizing Asteroid Resource Property Rights Into Law,” 2015). In the words of Eric Anderson, Planetary Resources’ co-founder, “[t]his is the single greatest recognition of property rights in history” (“President Obama Signs Bill Recognizing Asteroid Resource Property Rights Into Law,” 2015). The U.S., however, is not the only country that has recently taken steps to facilitate and support human endeavours in outer space; smaller states have also jumped on the bandwagon. Early last year, the government of Luxembourg started the award-winning SpaceResources.lu initiative, one of its principle goals being to aid the development of an international legal framework that allows the appropriation of resources harvested on celestial bodies (“FAQ,” 2017). Furthermore, the country has invested €25 million in Planetary Resources and adopted a draft law expected to enter into force this year, which guarantees private companies legal ownership of the resources they harvest in outer space (Schrieberg, 2017).

With these profound new developments in the space arena, there is an increasing demand for international legal certainty towards space mining, as future space explorers and miners have to be assured of their rights to use and exploit the resources they uncover (“FAQ,” 2017). Currently, however, there are international legal documents addressing property rights in space, namely the Outer Space Treaty and the Moon Treaty. The most prominent treaty addressing space activities is the Outer Space Treaty of 1967, a treaty

ratified by over one hundred nations, including China, the U.S., and Russia (United Nations Office for Disarmament Affairs, 2017). The Outer Space Treaty prohibits national appropriation of the moon and other celestial bodies; however, the treaty does not address appropriation by private companies, thus providing insufficient guidance for the recent developments in the space arena, as commercial space industry continues to grow (See Appendix I; “FAQ,” 2017; Riederer, 2014). The Moon Treaty of 1979 attempted to close the loophole in the Outer Space Treaty by prohibiting ownership of celestial bodies and their resources by any state, organization or private person (See Appendix II; “Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79; Listner, 2011). The treaty also requires the establishment of an international regime to regulate the exploitation of these resources when this becomes feasible (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79). However, the impact of the Moon Treaty on the international community is severely limited, as since its enactment, the treaty has only been ratified by seventeen countries, none of which are currently engaged in manned space exploration (See Appendix III; United Nations, 2017). Clearly, the governance of global commons like outer space is a challenge of international cooperation due to issues of sovereignty, exploitation and conflicting interests between states. Nonetheless, successful cases exist.

The Law of the Sea Treaty was adopted in 1982 and regulates activities in international waters, which just like outer space, are a global commons and are therefore beyond the limits of national jurisdictions (Schrijver, 2016, p. 1259). Contrary to the Moon Treaty, this treaty was very successful, considering to date, 168 states have ratified the agreement (*United Nations Convention On The Law Of The Sea*, 2016). The Law of the Sea Treaty introduced what is called the “common heritage of mankind principle,” a principle that entails that the deep seabed and the ocean floor cannot be appropriated and should be used for peaceful purposes only and for the benefit of mankind as a whole (Guntrip, 2003; Nelson, 2010, p. 396), due to the belief that these areas would otherwise be subject to an international scramble for resources which would lead to global instability (Melchin, 2015, p. 147). The Moon Treaty also applies this principle to the moon, its resources and other celestial bodies, and in existing literature, the Moon Treaty’s inclusion of the principle is broadly identified as the reason for the treaty’s low amount of ratifications (Lyll & Larsen, 2009). Due to the relative similarity of the two treaties (i.e. both treaties address the governance of global commons and are similar in content and language), a question remains: Why was the Law of the Sea Treaty successful, whereas the Moon Treaty was not?

1.1 Objective of the study

The unique concept of global commons poses international legal difficulties, which is proved by the outcome of the Moon Treaty. Although, some research has been conducted on the outcomes of the Moon Treaty and the Law of the Sea Treaty, a thorough examination of both in a broader context is needed. The underlying question revolves around the nature of international cooperation: Why and under what circumstances do states cooperate with each other, taken that the ordering principle of international relations is anarchy, that is, the absence of a central government? International relations theories, including realism and liberal institutionalism, address this issue, and thus, my research aims to answer the following question: How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty?

1.2 Scientific and societal relevance

1.2.1 *Scientific relevance*

Scientific relevance entails that a research should fill a gap in the existing scientific knowledge (White, 2008, p. 17). Cooperation between states is not an under-researched topic; many theories exist on the nature of international cooperation, and the circumstances under which cooperation is more likely are also widely discussed in existing literature (Jervis, 1978; Oye, 1985). Nonetheless, research on international cooperation in global commons is limited, especially in relation to international relations theory. Generally, the relevance of international relations theory in international law is disregarded, due to legal scholars' prevailing view of international law "as a collection of legal rules capable of being understood on their own" (Hillier, 1998, p. 12). However, multiple scholars assert that the connection between the two should not be ignored (Hillier, 1998; Setear, 1996; Walt, 1998). Thus, the outcome of my research will aid the ongoing discussion on the relevance of international relations theory in international law.

Furthermore, a literature gap is present when it comes to the analysis of the outcomes of the Moon Treaty and the Law of the Sea Treaty. The Moon Treaty is largely considered to have failed due to its applicability of the common heritage of mankind principle; however, as mentioned before, the Law of the Sea Treaty contains the same principle. Moreover, existing literature does not explain why some countries did ratify the Moon Treaty. My thesis addresses this gap by conducting a study that includes both treaties and examines their outcomes from a broader perspective, using international relations

theory as a framework. The outcomes of my thesis will help understand the differences in ratifications of the treaties and hereby assist the scientific debate.

1.2.2 Societal relevance

Societal relevance of research means that a research is relevant and important to aspects of human society; or more specifically, that the research answers questions that society asks or solves problems society faces (Wilbertz, 2013, p. 2). My thesis is societally relevant in various ways. First, the outcomes of my thesis will benefit the future discussions on the development of a legal regime for space mining, as my thesis can help identify the circumstances under which international cooperation in global commons is likely and unlikely. These findings can help policy makers in the development of relevant treaties or in the writing of possible amendments to the Moon Treaty.

Second, matters concerning outer space and international waters affect the livelihoods and well-being of people all over the world. For instance, in 2009, the government of China filed a case to the United Nations, claiming China has sovereignty over the islands in the South China Sea, and therefore, has sovereign rights and jurisdiction over the relevant waters, seabed and subsoil thereof (Mollman, 2016). The Philippines, Indonesia and Vietnam objected to China's claims, arguing the claims have no legal basis under the Law of the Sea Treaty (Mollman, 2016). The outcomes of the issues regarding the South China Sea could impact millions of people, as there are concerns that China might become more aggressive after an unfavourable ruling. In fact, almost immediately after the case was filed, China started building, and afterward militarizing, artificial islands to portray its developing maritime power (Mollman, 2016). Ultimately, the insufficient regulation of global commons can lead to global instability (Melchin, 2015, p. 147). Evidently, my thesis addresses crucial topics that matter to the scientific community as well as society.

1.3 Structure of the study

This thesis is structured as follows: the second chapter of the thesis provides the reader with an introduction on the Moon Treaty and the Law of the Sea Treaty and on the existing claims about the differences in ratifications of the treaties. Based on the literature review, a literature gap will be identified and I will mention how this thesis can address this gap. The third chapter discusses the theoretical framework that will guide this thesis, addressing the theories of realism and liberal institutionalism and their views on international cooperation.

Based on the theory, I will come up with predictions that will allow me to analyse the explanatory leverage of each theory in regard to the differences in ratifications of the treaties. The following chapter will discuss the research design, explaining the applicability of a congruence analysis method, as well as the rationale of the case selection. In the fifth chapter, the analysis will take place and the findings will be discussed in the sixth chapter, which will offer the final answer to the question: How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty? The thesis concludes with the concluding chapter, which will provide a short summary of the findings and include the encountered limitations of the research as well as suggestions for further research in this area.

2 Literature review

Reviewing the existing literature in a given area or on a specific topic helps to avoid answering questions that have already been answered before, also known as “re-inventing the wheel” (White, 2008, p. 17). Indeed, one of the requirements of scientific inquiry is that it should build on existing literature (White, 2008, p. 17). This chapter will discuss present literature on the outcomes of the Moon Treaty and the Law of the Sea Treaty. Based on the literature review, a literature gap will be identified.

2.1 Introduction to the Moon Treaty

In 1979, the Moon Treaty – officially known as the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies – was adopted as a follow-on to the 1967 Outer Space Treaty (Steenhard, 2010). The Moon Treaty contains 21 articles and largely repeats the language and provisions of the Outer Space Treaty, including the idea that outer space is the common heritage of mankind (See Appendix I and II; United Nations, 2002), hereby asserting that space exploration and exploitation should be done for the benefit of all and exclusively for peaceful purposes (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, pp. 78–79; United Nations, 2002, pp. 4–5). Furthermore, corresponding with the Outer Space Treaty, the Moon Treaty mentions that all states are allowed to explore the moon and other celestial bodies and use their resources (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 78; United Nations, 2002, p. 4).

However, an issue that had not been fully addressed by the Outer Space Treaty was the status of private property rights (Reynolds, 1995, p. 115). Under the Outer Space Treaty, the status on private ownership by individuals and corporations is somewhat unclear, as the treaty only explicitly forbids ownership of the moon’s resources by governments (United Nations, 2002, p. 4). Since private appropriation is not explicitly forbidden by the agreement, ownership of the moon’s resources by individuals or corporations remains permissible (Reynolds, 1995, p. 115). Consequently, the Moon Treaty prohibits not only national appropriation of celestial bodies and their resources, but also appropriation by

organizations and persons (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79).

Additionally, the Moon Treaty obliges its signatories to establish an international regime for the exploitation of outer space resources as soon as that exploitation becomes feasible (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79). Article 11 of the treaty mentions the regime’s main purposes, which are to guarantee the orderly and safe development of the resources, the rational management of the resources, as well as an “equitable sharing” in the benefits derived from the resources among all parties (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79). The treaty states that the interests and needs of developing countries, as well as the efforts of those countries which have contributed to the exploration shall be given special consideration (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79). Other differences between the Outer Space Treaty and the Moon Treaty are the Moon Treaty provision that allows moon bases to be established and the Moon Treaty’s environmental obligations upon its signatories to ensure the environment is not harmfully affected (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, pp. 78–79).

2.2 Explaining the policy outcome of the Moon Treaty

Since entering into force in 1984, the Moon Treaty has only been ratified by seventeen countries, none of which are major space-faring powers (See Appendix III; Steenhard, 2010). Consequently, the treaty is largely regarded as a failure and has no direct relevance to current space activities (Steenhard, 2010). From the existing literature, a broad consensus on the nature of the treaty’s failure can be found: the treaty’s applicability of the common heritage of mankind principle to outer space resources (Lyll & Larsen, 2009, p. 183), and more specifically the provision on equitable sharing (Filho, 2016, p. 128; Reynolds, 1995). Especially, spacefaring countries find this provision problematic, since it decreases economic incentives to invest in space mining (Lyll & Larsen, 2009, p. 196). Scholars Francis Lyll and Paul Larsen state that historically, not a search for scientific knowledge, but commercial considerations mostly influenced exploration of the earth and therefore, argue it is not surprising that currently no space-faring power ratified the Moon Treaty (Lyll & Larsen, 2009, pp. 190–196). To the scholars’ belief, the common heritage of

mankind principle prevents development rather than encouraging it (Lyall & Larsen, 2009, p. 196).

2.3 Introduction to the Law of the Sea Treaty

In 1982, after a process spanning fifteen years, the United Nations Convention on the Law of the Seas was adopted, and in 1994, the Convention officially entered into force (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998). The Law of the Sea Treaty contains 302 articles governing every aspect of ocean space, such as delimitation, environmental control, scientific research, economic and commercial activities, and the settlement of disputes relating to ocean matters (United Nations Office of Legal Affairs, 2017).

Maritime zones

The Law of the Sea Treaty establishes a legal regime which is based on maritime zones (see Appendix IV). Each coastal nation is granted a territorial sea limit of twelve nautical miles (i.e. 22 kilometres) starting from its coastline, giving states the sovereign right to limited ownership of sea surrounding their state, where they can exploit any resources and enforce any laws or regulations to ensure the safety of navigation and protect their territorial sea (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998, “United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 27–32). However, the treaty also establishes the right of “innocent passage,” meaning that other states can still travel peacefully through the territorial waters of coastal states, as long as this travel does not impede the good order, peace and security of the coastal nation (Ashfaq, 2008, pp. 363–364; “United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 31–32). To ensure international passage through straits, the Law of the Sea Treaty establishes what is called the right of “transit passage,” allowing ships and aircrafts to navigate through the strait, unless another similar convenient route exists which goes through the high seas or an exclusive economic zone (“United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 36–37).

Exclusive Economic Zones

The Law of the Sea Treaty also includes what are called exclusive economic zones (EEZs), which are zones covering an area of maximum 200 nautical miles (i.e. 370 kilometres), in which nations enjoy an exclusive right to exploit, explore, manage and conserve the natural

resources (“United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 43–44). The outer limits of the EEZs mark the start of international waters (i.e. high seas), which cannot be appropriated and are free and open to all states. The “freedom of the high seas” refers to freedom of navigation, fishing and marine scientific research (Bollmann et al., 2010, p. 205). However, the treaty also imposes environmental obligations upon states (Ashfaq, 2008, p. 364; “United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 46). For instance, coastal states have to properly preserve and maintain the living resources in their EEZ as to avoid endangerment by overexploitation (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 46) and state parties are required to take measures to combat marine pollution (“United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 100–101).

Continental shelf

Another important part of the treaty addresses continental shelves. By the treaty’s definition, a continental shelf consists of “the seabed and subsoil of the submarine areas that extend beyond [a coastal state’s] territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance” (Ashfaq, 2008, p. 365; “United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 53). In these continental shelves, the coastal states exercise exclusive sovereign rights to explore and exploit the natural resources (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 54).

Common heritage of mankind principle

In Article 137 and 138, the Law of the Sea Treaty establishes that the resources in the deep seabed beyond the continental shelf are the common heritage of mankind, meaning appropriation of these resources is prohibited and their use should be for the benefit of all states, taking the interests and needs of developing countries into special consideration (Bollmann et al., 2010, p. 205; “United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 70).

International Seabed Authority

To oversee all the activities in an effective manner and to act on behalf of mankind, the treaty provides for the establishment of an International Seabed Authority, whose purpose is to regulate and authorize the exploitation of the natural resources in international waters, and to collect and distribute royalties from these activities (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 81). In Article 140, the Law of the Sea Treaty establishes that “the authority shall provide for the equitable sharing of financial and other economic benefits derived from activities in the area,” considering the needs and interests of developing states (“United Nations Convention on the Law of the Sea Act 1996,” 1997, pp. 71–80). In fact, half the seabed areas are reserved for developing countries. However, currently, deep seabed mining is still unprofitable and the appropriate technology is lacking (Bollmann et al., 2010, p. 205).

Settlement of disputes

Regarding the settlement of disputes, the treaty establishes a combination of binding and non-binding mechanisms. If direct negotiations between the relevant parties do not succeed, the Law of the Sea Treaty gives them a choice among four binding procedures: (1) submission of the dispute to the International Tribunal for the Law of the Sea; (2) judgment by the International Court of Justice; (3) submission of the dispute to international adjudication procedures; or (4) submission to special adjudication tribunals with expertise in specific types of disputes (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998). Sensitive cases involving national sovereignty are submitted to a non-binding conciliation commission (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998).

2.4 Explaining the policy outcome of the Law of the Sea Treaty

The Law of the Sea Treaty is considered one of the most comprehensive multilateral agreements in existence, and being ratified by 168 countries, is one of the most widely accepted international treaties (Kraska, 2007, p. 544; *United Nations Convention On The Law Of The Sea*, 2016). When it comes to explaining the large number of ratifications, scientific evidence falls relatively short. However, broadly, two reasons can be identified in existing literature as to explain the large numbers of ratifications.

First, the treaty is deemed successful, since it is the result of a grand bargain carefully achieved by balancing interests of all nations involved (Kraska, 2007, p. 544). In 1973, the Third U.N. Conference on the Law of the Sea was convened in New York and ended nine years later with the adoption of the Law of the Sea Treaty in 1982. During those nine years, representatives of over 160 countries, travelled back and forth between Geneva and New York to engage in marathon negotiations, discussing the issues, bargaining and trading national rights and obligations (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998). Ultimately, the treaty seems to have been successful in finding a middle ground to which most nations could agree.

The other identifiable reason as to why the Law of the Sea Treaty has been widely ratified, is because of its inclusion of exclusive economic zones. According to scholar Sarah Ashfaq, this provision was considered to be one of the most revolutionary and generous provisions of the treaty, granting signatory nations the full right to exploit resources within their exclusive zones, which contain a great amount of valuable resources (Ashfaq, 2008, p. 364).

2.5 The literature gap

Despite the different outcomes in ratifications, the treaties are broadly similar in content and language. For instance, the Moon Treaty applies the common heritage of mankind principle to the moon and other celestial bodies, a provision that was inspired by the Law of the Sea Treaty (U.S. Office of Technology Assessment, 1981, p. 758). Furthermore, the purpose of the Moon Treaty was to establish a regime similar to the one established for the deep seabed (Steenhard, 2010). As seen from the literature review, scholars discussing the Moon Treaty state that it failed due to the treaty’s provision on equitable sharing. Given that the Law of the Sea Treaty was widely ratified despite its inclusion of this provision, the large consensus on the main source of disapproval for the Moon Treaty being the common heritage of mankind principle, does not sufficiently seem to explain the outcome in ratifications. Furthermore, there are no explanations given as to why the seventeen countries that did ratify the Moon Treaty, did do so. These factors are all part of the puzzle that needs to be explained.

Ultimately, the gap in existing literature lies in the primary focus on the content of both treaties when explaining their outcomes, while broadly neglecting to look at factors that influence states to cooperate in general. Robert Keohane argues cooperation occurs when “actors adjust their behaviour to the actual or anticipated preferences of others,

through a process of policy coordination [or negotiation]” (Keohane, 1985, p. 51). International relations theory provides insights into why and under what circumstances international cooperation takes place and therefore, my research question is as follows: How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty? By comparing the treaties and applying international relations theory to the outcomes, a better understanding of international cooperation in global commons can be achieved. The literature gap can therefore be addressed with this thesis and will aid the scientific debate, with the ultimate purpose of helping improve the development of future proposals for space law or the development of possible amendments to the Moon Treaty.

3 Theoretical framework

Of all the existing international relations (IR) theories, I have chosen realism and liberal institutionalism to analyse the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty. The reason why I chose these two theories is due to the difference in the theories' perception on the nature of international cooperation. Particularly, this difference matters to my thesis, since it would not be helpful for my research to compare two theories that have a similar view on cooperation between states.

This chapter will start by discussing realism and then liberal institutionalism. The theories' key concepts will be discussed, as well as their perception on the nature of cooperation between states. For each theory, six conditions will be formulated that will help identify their explanatory leverage for the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty.

3.1 When do states cooperate?

States cooperate in various ways, including through treaties, international regimes, and international organizations or institutions. Although, these concepts are often used interchangeably by IR scholars, they are not exactly the same (Molle, 2014). The differences between these definitions do not make any difference in my thesis, as I am looking at cooperation between states in general when building my theoretical framework, thus through any of these means: treaties, international regimes, and international organizations or institutions. This is because existing research does not clearly distinguish between countries' rationales for participating in treaties, regimes or international organizations. I write my thesis under the assumption that rationales for cooperation in treaties, regimes and international organizations are not significantly different, at least not to the extent that it would undermine my propositions.

Among IR scholars, there are differences in the perception on why and under what circumstances states cooperate. As mentioned before, both realists and liberal institutionalists have a different view on this. My thesis aims to examine why ratifications were different for the Moon Treaty and the Law of the Sea Treaty by looking at the differences between these theories' perception on cooperation between states. As the

liberal scholar Keohane says, “in order to understand the conditions under which international cooperation can take place [...] it is necessary to understand the conditions under which international institutions come into being” (Keohane, 1988, p. 380). Therefore, I will formulate six conditions for each theory, which will form the theoretical framework for my analysis.

3.1.1 *Realism and international cooperation*

Realists regard the international system as anarchic, as there is no central power or higher authority beyond nation states that can enforce a system of rules. Consequently, compliance with international law cannot be ensured. This results in the collective goods problem – the problem of how to provide something that benefits all members of a group regardless of what each member contributes to it (Goldstein & Pevehouse, 2014, p. 4). Due to these circumstances, states must rely on self-help to guarantee their survival, which is their principal goal, as they want to maintain their sovereignty (Goldstein & Pevehouse, 2014, pp. 51–52).

Besides these assumptions, realism has two other key concepts. The first key concept of realism is that states are rational actors. This means that states are capable of identifying their interests and putting priorities on their interests. This rationality concept is supported by two assumptions. The first assumption is that states are single actors that can “think” about their actions. The second assumption is that states are able to perform a cost-benefit analysis, meaning they can calculate the costs resulting from a possible action and the benefits the action is likely to bring (Goldstein & Pevehouse, 2014, p. 76). Thus, in realists’ view, international relations can best be explained by choices of states operating as unitary actors that rationally pursue their own interests in an international system of sovereign states where central authority is absent (Goldstein & Pevehouse, 2014, pp. 43–45).

The second key concept of realism is that international relations can be explained in terms of power (Mearsheimer, 1995). The level of power of a state is determined by the state’s capabilities. Realists see power as a relational concept, meaning a state can only have power relative to another state’s power. This type of power is called relative power – the ratio of power that states can bring to bear against one another (Goldstein & Pevehouse, 2014, p. 47). Central to the idea of relative power is the perception that states are not simply concerned about whether they can gain by cooperation, instead, they are concerned about who gains most in military and economic power (Franzese, R.J. and Hiscox, 1998, p. 2).

Thus, it matters little whether a state's capabilities are rising or declining in absolute terms, but only whether they are falling behind or overtaking the capabilities of rival states (Mearsheimer, 1995).

In the anarchic system, the most reliable means to combat the power of one state is the power of other states. The term balance-of-power refers to this concept of one or more states' power being combined to balance that of one or more states (Goldstein & Pevehouse, 2014, p. 52). Related to this point is the realist view on cooperation through alliances, which is a coalition of states that coordinate their actions to accomplish some ends (Chatturvedi, 2005, p. 187). Most alliances are formalized in written treaties, concern issues of international security, and endure across a range of issues and a period of time (Chatturvedi, 2005, p. 187). Alliances generally have the purpose of augmenting their members' power by pooling capabilities. For smaller states, alliances can be their most important power element, and for great powers the structure of alliances shape the configuration of power in the system. In the realist view, states cooperate "when a collection of states have faced a common threat and have pooled their relative power to defend it" (Weiss & Wilkinson, 2013, p. 94). For instance, when a state grows and threatens that of its rivals, the latter often form an alliance to limit that power (Chatturvedi, 2005, p. 188). Consequently, most alliances form in response to a perceived threat.

Another realist concept related to power is the so-called hegemonic stability theory. Hegemony is when one state holds a supremacy of power in the international system, permitting it to control the arrangements and rules by which international, economic and political relations are conducted (Goldstein & Pevehouse, 2014, pp. 57–58). According to the hegemonic stability theory, hegemony establishes order in the international system similar to a central government (Goldstein & Pevehouse, 2014, p. 59). One mechanism through which world hegemony is expressed is through international organisations, as international institutions and rules are generally initiated by the hegemon and at the very least need to have that state's support (Cox & Sinclair, 1983, pp. 62–63). Consequently, as scholar Robert Krasner explains, without the presence of a strong leadership, there will be a weakening of regimes, as principles, norms and rules cannot readily be upheld (Krasner, 1982, p. 199).

Realists also argue that, since a state's primary objective is to survive, security and geostrategic issues (i.e. high politics) dominate the national agenda (Jervis, 1982, p. 358). The basic assumption is that the more an issue concerns high politics, the more states are inclined to act alone (Jervis, 1982, p. 358; Pusterla, 2016, p. 83). On the contrary, the less

the issue concerns high politics, the more states are inclined to cooperate (Pusterla, 2016, p. 83). Scholar Robert Jervis argues that issues that concern high politics are harder to cooperate on, due to four differences between security and non-security issues: (1) security issues involve greater competitiveness; (2) offensive and defensive security motives frequently lead to the same behaviour, which is rarely the case in non-security issues; (3) the stakes are higher in security areas than in non-security areas, because small errors can have big consequences, and thus the costs of living up to the rules of a regime while others are not, are greater; and (4) detecting what others are doing and measuring one's own security is difficult (Jervis, 1982, pp. 358–359). Thus, cooperation is considered easier to accomplish in low politics areas and much more problematic in high politics areas.

Jervis also indicates that in low politics areas, such as trade or seabed exploitation, cooperation is desirable, as a frequent issue in these areas is that unrestrained competition can harm all the actors, which is portrayed in the prisoner's dilemma (Jervis, 1982, p. 358). The prisoner's dilemma is a situation modelled by game theory in which rational actors pursuing their individual interest all achieve worse outcomes than they could have by working together (Goldstein & Pevehouse, 2014). According to Jervis, when such a model applies, states will benefit by setting up rules and institutions to control the competition among them (Jervis, 1982, p. 358).

Based on the theory, if realism explains the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty, the factors in Table 1 will apply:

Table 1: Assumptions for realism

Factor	Assumption
Relative gains	I assume that relative gains increase the likelihood of treaties to succeed. A state that gains relative to other states from a treaty, is likely to participate in such a treaty, whereas a state that loses relatively to other states from a treaty, is not likely to participate in such a treaty.
Balance-of-power threat	I assume that balance-of-power threats influence states' decision to participate in treaties. Treaties affecting the balance-of-power have a higher or lower chance of succeeding, depending on the state's power. Developing states are more likely to participate in treaties that ameliorate the balance-of-power, whereas powerful states are less interested in treaties that equalize relative powers.
Common threat	I assume that common threats increase the likelihood of states to participate in treaties. Considering that common threats facilitate cooperation, states are likely to participate in treaties that bring solutions to a common threat. However, if the treaty does not address a common threat, states are not likely to participate in that treaty.
Hegemon participation	I assume that hegemon participation increases the likelihood of other states to participate in treaties. Considering that the hegemon dominates the rules and arrangements by which international, economic and political relations are conducted, I assume that when a hegemon participates in a treaty, other states will follow. However, if the hegemon does not participate in a treaty, there is no strong leadership, and other states will not likely participate in the treaty.
High/low politics	I assume that the type of politics influence states' decision to participate in treaties. Considering that issues of high politics (sovereignty and national security matters) are harder to cooperate on than issues of low politics (matters concerning economics and other less important issues to a state's survival), I assume that treaties that concern high politics have a higher chance of failing than do treaties concerning low politics.
Competition control	I assume that the level of unrestrained competition influences the likelihood of states to participate in treaties. Since unrestrained competition can harm all actors involved, treaties that control competition and set up rules and procedures for this end, have a higher chance of succeeding.

3.1.2 Liberal institutionalism and international cooperation

Liberal institutionalism also relies on the realist principle of anarchy in the international system; however, the theory is generally more optimistic than realism about the prospects for peace (Goldstein & Pevehouse, 2014, p. 86; Ikenberry, 2001). According to the theory, states are capable of forgoing their short-term individual interests in order to advance the

long-term well-being of the community (Goldstein & Pevehouse, 2014, p. 87). States seek to maximize absolute gains through cooperation and are less concerned about the advantages of other states resulting from cooperative arrangements (Devitt, 2010; Powell, 1991). Unlike realists, liberal institutionalists do not regard institutions as merely the reflection of the preferences and power of the states that established them; they believe institutions themselves shape the preferences of states (Keohane, 1988, p. 382).

In the liberal institutionalist view, cooperation is possible and desirable. According to scholar Robert Keohane, international regimes are essential, because world politics is characterized by institutional deficiencies that inhibit mutually advantageous coordination (Keohane, 1982). Thus, despite the constraints they impose on states, states willingly pass on significant power to international institutions, because they reduce transaction costs associated with rule-making, negotiating, implementing, enforcing, information gathering and conflict resolution (Krasner, 1982, pp. 141–156). Consequently, international institutions appear when transaction costs are relatively low compared to the benefits derived from the political exchange (Keohane, 1988). In contrast, if transaction costs are insignificant, it is not necessary to establish new institutions, and if transaction costs are extremely high, it is not possible to create institutions (Keohane, 1988).

According to liberal institutionalism, cooperation is also dependent on demand. Keohane argues that “where the demand for agreements is positive at some level of feasible cost, and the supply of agreements is not infinitely elastic and free, there may be a demand for international regimes if they actually make possible agreements yielding net benefits that would not be possible on an *ad hoc* basis” (Keohane, 1982, p. 337). International regimes facilitate mutually beneficial agreements and get rid of the necessity of packages of agreements, which are difficult to construct, especially when time is short (Keohane, 1982, p. 343). Scholar Ronald Coase developed a list which indicates in which cases regimes are to be of value in facilitating agreements among governments: (1) when there are positive transaction costs; (2) when there is a lack of a clear legal framework establishing liability for actions; and (3) when there are information imperfections (Keohane, 1982, pp. 337–338).

Regarding the third point, regimes make agreements easier if they improve the quality and quantity of information available to the states involved, since they help to coordinate the states’ expectations (Keohane, 1982, pp. 338–339). High-quality information reduces uncertainty among the actors involved, and therefore, it can be expected that there will be a demand for international regimes that provide such information (Keohane, 1982, p. 344).

In the liberal institutionalist view, hegemony can also influence regime outcomes. In contrast with the traditional realist perception on hegemony, liberal institutionalists suggest that as hegemony declines, a greater incentive for collaboration will exist, since collective goods are no longer provided by the hegemon in the system (Krasner, 1982, p. 199). According to liberal scholar Arthur Stein, hegemonic decline can lead to stronger regimes. He argues that when states perceive that a hegemon is no longer willing to offer a free ride, the states are likely to become paying customers (Krasner, 1982, p. 199; Stein, 1982). Thus, order is not dependent on hegemony, but can effectively be sustained by interests alone (Krasner, 1982, p. 199).

Based on the theory, if liberal institutionalism explains the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty, the factors in Table 2 will apply:

Table 2: Assumptions for liberal institutionalism

Factor	Assumption
Absolute gains	I assume that absolute gains increase the likelihood of treaties to succeed. A state that gains from a treaty, is likely to participate in a treaty, whereas a state that does not gain from a treaty, is not likely to participate in such a treaty.
Transaction costs	I assume that reduced transaction costs increase the likelihood of treaties to succeed. Considering that world politics is characterized by institutional deficiencies, a state is likely to participate in a treaty that reduces transaction costs associated with rule-making, negotiating, implementing, enforcing, information gathering and conflict resolution. However, a state is not likely to participate in treaties where transaction costs are negligible or extremely high.
Institutional participation	I assume that participation in institutions and treaties increases the likelihood of cooperation. Considering that institutions shape the preferences and norms of states, a state that participates in treaties makes them more cooperative; hence, they are in general more likely to join treaties, as compared to a state that does not participate in treaties.
Legal framework demand	I assume that the demand for a legal framework increases the likelihood of states to participate in treaties. When there is a lack of a clear legal framework establishing liability for actions, states are likely to join treaties that establish such a framework. However, if there is not a demand, the treaty will not be successful.
Information demand	I assume that demand for specific information increases the likelihood of states to participate in treaties. Considering that high-quality information reduces uncertainty among actors, states are likely to participate in treaties if they improve the quality and quantity of information available to the states involved, since this helps to coordinate the states' expectations. However, if there is no demand for high-quality information or if the treaty does not improve the quality and quantity of information available to the states involved, states are not likely to participate in the treaty.
Hegemonic decline	I assume that hegemonic decline increases the likelihood of states to participate in treaties. Since hegemonic decline can lead to stronger regimes, if there is an interest, states are more likely to participate in treaties when there is no hegemon leadership, as compared to when there is a hegemon leadership.

4 Research design

This chapter discusses how I will execute the research. First, I will explain why I have chosen a congruence analysis approach for my research and why I have chosen the Moon Treaty and the Law of the Sea Treaty as my two cases. Then I will discuss the predictions and expectations for each theory, which will help me identify their explanatory leverage for the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty.

4.1 Congruence analysis

To operate my research question, I will conduct a congruence analysis. As Haverland and Blatter explain, “a *congruence analysis* approach [...] is a small-N research design in which the researcher uses case studies to provide empirical evidence for the explanatory relevance or relative strength of one theoretical approach in comparison to other theoretical approaches” (Blatter & Haverland, 2012, p. 144). This method is relevant for my thesis, as I am analysing the explanatory power of two international relations theories in relation to the ratifications of the Moon Treaty and the Law of the Sea Treaty.

In order to analyse the relative strength of the theoretical approaches, the researcher must formulate sets of specific propositions and observable implications from the theories and afterwards compare a set of empirical observations with these implications drawn from the theories (Blatter & Haverland, 2012, p. 144). A higher degree of congruence between the implications and the observed evidence from one theory, in comparison to the degree of congruence between the expectations drawn from another theory and the empirical evidence, means that the former theory has a stronger explanatory power (Blatter & Haverland, 2012, p. 144).

Haverland and Blatter distinguish between two subtypes of the congruence analysis: a competing theories approach and a complementary theories approach. The complementary theories approach entails that theories lead to complementary implications in reality and multiple theories provide the basis for comprehensive understandings and explanations (Blatter, 2012, p. 12). The competing approach, however, entails that divergent theories result in contradictory implications in reality. This approach tests theories that stand in stark opposition to each other, in order to identify the best or most important

theory (Blatter, 2012, p. 12). The competing approach is relevant for my research question as I am comparing realism with liberal institutionalist theory – two divergent theories.

4.2 Case selection

I have chosen the Moon Treaty and the Outer Space Treaty for my analysis for two reasons. The main reason why I chose these treaties is because I want to analyse international cooperation by examining treaties with divergent outcomes, and looking at their number of ratifications, the Moon Treaty was a huge failure with only seventeen ratifications, whereas the Law of the Sea Treaty was a huge success with 168 ratifications as of today. Another reason why I chose the two treaties for my study is the fact that both treaties are framework treaties; they both concern the regulation of global commons – international waters and outer space – and thus have a similar purpose. The deep seabed and outer space are also similar in that they are remote and relatively unexplored areas (Shackelford, 2009, p. 112). Moreover, both treaties negotiate something that was technically not feasible at the time of the negotiations – seabed mining and space mining (Nithi, 2016; Shackelford, 2009, p. 112; U.S. Office of Technology Assessment, 1981, pp. 758–759). Furthermore, the treaties are similar in content and language. For instance, both treaties apply the common heritage of mankind principle, a principle that scholars identified as the main reason why the Moon Treaty failed. With my research, I attempt to analyse why the Law of the Sea Treaty was successful, whereas the Moon Treaty was not.

4.3 Predictions and expectations for realism

Haverland and Blatter define predictions as the concrete observations that we can expect in the empirical world (Blatter & Haverland, 2012, p. 160). To help guide this research, the following predictions and expectations have been formulated for realism:

The first prediction for realism concerns relative gains and entails that relative gains increase the likelihood of treaties to succeed. Based on theory, my assumption is that a state that gains relative to other states from a treaty, is likely to participate in such a treaty, whereas a state that loses relatively to other states from a treaty, is not likely to participate in such a treaty. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty provides relative losses for countries that did not ratify the treaty. Since the Law of the Sea Treaty was successful, I would expect to find evidence that the treaty provides relative gains for countries that ratified the treaty.

The second prediction for realism concerns balance-of-power and entails that balance-of-power threats influence states' decision to participate in treaties. My assumption is that treaties affecting the balance-of-power have a higher or lower chance of succeeding, depending on the state's power. Developing states are more likely to participate in treaties that ameliorate the balance-of-power, whereas powerful states are less interested in treaties that equalize relative powers. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty poses a balance-of-power threat to the countries that did not ratify the treaty. Regarding the Law of the Sea Treaty, I would expect to find evidence that the treaty does not pose a balance-of-power threat to the countries that ratified the treaty.

The third prediction for realism concerns common threats and entails that common threats increase the likelihood of states to participate in treaties. Considering that common threats facilitate cooperation, states are likely to participate in treaties that bring solutions to a common threat. However, if the treaty does not address a common threat, states are not likely to participate in that treaty. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty did not address a common threat. Since the Law of the Sea Treaty was successful, I would expect to find evidence that the treaty addressed a common threat.

The fourth prediction for realism concerns hegemon participation and entails that hegemon participation increases the likelihood of other states to participate in treaties. Considering that the hegemon dominates the rules and arrangements by which international, economic and political relations are conducted, when a hegemon participates in a treaty, other states will follow. However, if the hegemon does not participate in a treaty, there is no strong leadership, and other states will not likely participate in the treaty. Since the Moon Treaty was not successful, I would expect to find evidence that the hegemon does not participate in the treaty. Since the Law of the Sea Treaty was successful, I would expect to find evidence that the hegemon participates in the treaty.

The fifth prediction concerns high/low politics and entails that the type of politics influence states' decision to participate in treaties. Considering that issues of high politics (sovereignty and national security matters) are harder to cooperate on than issues of low politics (matters concerning economics and other less important issues to a state's survival), treaties that concern high politics have a higher chance of failing than do treaties concerning low politics. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty concerns high politics. Since the Law of the Sea Treaty was successful, I would expect to find evidence that the treaty concerns low politics.

The sixth prediction concerns competition control and entails that the level of unrestrained competition influences the likelihood of states to participate in treaties. Since unrestrained competition can harm all actors involved, treaties that control competition and set up rules and procedures for this end, have a higher chance of succeeding. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty does not adequately control competition and sets up rules and procedures for this end. Since the Law of the Sea Treaty was successful, I would expect to find evidence that the treaty adequately controls competition and sets up rules and procedures for this end.

4.4 Predictions and expectations for liberal institutionalism

To help guide my research related to liberal institutionalism, the following predictions and expectations have been formulated:

The first prediction for liberal institutionalism concerns absolute gains and entails that absolute gains increase the likelihood of treaties to succeed. A state that gains from a treaty, is likely to participate in a treaty, whereas a state that does not gain from a treaty, is not likely to participate in such a treaty. Since the Moon Treaty was not successful, I would expect to find evidence that the treaty does not provide absolute gains for the countries that did not ratify the treaty, whereas for the Law of the Sea Treaty, I would expect to find evidence that the treaty provides absolute gains for the countries that ratified the treaty.

The second prediction for liberal institutionalism concerns transaction costs and entails that reduced transaction costs increase the likelihood of treaties to succeed. Considering that world politics is characterized by institutional deficiencies, a state is likely to participate in a treaty that reduces transaction costs associated with rule-making, negotiating, implementing, enforcing, information gathering and conflict resolution. However, a state is not likely to participate in treaties where transaction costs are negligible or extremely high. Since the Moon Treaty was not successful, I would expect to find evidence that transaction costs associated with the treaty are either negligible or extremely high. Since the Law of the Sea Treaty was successful, I would expect to find evidence that transactions costs associated with the treaty are low.

The third prediction for liberal institutionalism concerns institutional participation and entails that participation in institutions and treaties increases the likelihood of cooperation in treaties. Considering that institutions shape the preferences and norms of

states, a state that participates in treaties makes them cooperative; hence, they are in general more likely to join treaties, as compared to a state that does not participate in treaties. Since the Moon Treaty was not successful, I would expect to find evidence that there previously were no treaties addressing space that countries cooperated on. Since the Law of the Sea Treaty was successful, I would expect to find evidence that there previously were treaties addressing the high seas that countries cooperated on.

The fourth prediction for liberal institutionalism concerns legal framework demand and entails that the demand for a legal framework increases the likelihood of states to participate in treaties. When there is a lack of a clear legal framework establishing liability for actions, states are likely to join treaties that establish such a framework. However, if there is not a demand, the treaty will not be successful. Since the Moon Treaty was not successful, I would expect to find evidence that there was no demand for a clear legal framework prior to the negotiations, or if there was a demand, the treaty does not establish a clear legal framework. Concerning the Law of the Sea Treaty, I would expect to find evidence that there was a demand for a clear legal framework prior to the negotiations, and the treaty establishes a clear legal framework.

The fifth prediction for liberal institutionalism concerns information demand logic and entails that demand for specific information increases the likelihood of states to participate in treaties. Considering that high-quality information reduces uncertainty among actors, states are likely to participate in treaties if they improve the quality and quantity of information available to the states involved, since this helps to coordinate the states' expectations. However, if there is no demand for high-quality information or if the treaty does not improve the quality and quantity of information available to the states involved, states are not likely to participate in the treaty. Since the Moon Treaty was not successful, I would expect to find evidence that there was no information demand prior to the negotiations, or if there was a demand, the treaty does not improve the quality and quantity of information available. Concerning the Law of the Sea Treaty, I would expect to find evidence that there was an information demand prior to the negotiations, and that the treaty improves the quality and quantity of information available.

The sixth prediction for liberal institutionalism concerns hegemonic decline and entails that hegemonic decline increases the likelihood of states to participate in treaties. Since hegemonic decline can lead to stronger regimes, if there is an interest, states are more likely to participate in treaties when there is no hegemon leadership, as compared to when there is hegemon leadership. Since the Moon Treaty was not successful, I would expect to

find evidence that a hegemonic decline was not present, whereas for the Law of the Sea Treaty, I would expect to find evidence that there was a hegemonic decline.

4.5 Data collection

For each prediction listed in the previous chapter, I will look at different sources and explain what I found and whether or not my predictions are confirmed. The type of sources I will use include: the official documents of the treaties, academic journals, newspapers, websites, books, as well as documents on the decisions of the countries to participate, to the extent these sources are available in English or Dutch.

4.6 Analysis of explanatory power

The outcomes of the research will be determined by looking at how much explanatory power each theory has for the outcome of the Moon Treaty and the Law of the Sea Treaty. I will do this by analysing each of the predictions and place its explanatory value at either 0 or 1:

Table 3: Explanatory value of theories

Scale	Explanatory value
Low (0)	No explanatory value for the treaty outcome
High (1)	High explanatory value for the treaty outcome

No explanatory value means that according to the evidence, the factor cannot explain differences in ratifications of the treaties. High explanatory value means that evidence shows that the factor can explain differences in ratifications of the treaties. This scale will help me determine the level of validity for each prediction and thus also the explanatory leverage for each theory, a higher number representing a higher explanatory leverage. Based on this analysis, I will be able to make a conclusion for my research.

5 Analysis

This chapter will seek to find answers to my research question, by collection evidence for each prediction and see whether the expectation was met or not met. First, I will analyse the predictions and expectations for realism, providing a collection of evidence for the factors: relative gains, balance-of-power threat, common threat, hegemon participation logic, high/low politics and competition control. The second part of my analysis will look at the predictions and expectations for liberal institutionalism, providing a collection of evidence for the factors: absolute gains, transaction costs, institutional participation, legal framework demand, information demand, and hegemonic decline.

5.1 Realism

5.1.1 *Relative gains*

Based on theory, my assumption is that a state that gains relative to other states from a treaty, is likely to participate in such a treaty, whereas a state that loses relatively to other states from a treaty, is not likely to participate in such a treaty.

The Moon Treaty

The common heritage of mankind principle as applied in the Moon Treaty consists of four elements: (1) the principle prohibits the acquisition of the moon and other celestial bodies; (2) the principle entails that outer space should be used for peaceful purposes only; (3) the principle requires the benefits derived from outer space resources to be shared equitably; and (4), an international regime shall govern the exploitation of these resources (Guntrip, 2003). Clearly, the requirement that any benefits derived from the exploitation of mineral resources on the moon must be shared internationally is problematic for states with space capabilities (Lee, 2012, p. 318), as it decreases their relative economic power; whereas it is beneficial for countries with no space capabilities, as it increases their relative economic position. Not surprisingly, the industrialised states and the developing states were in disagreement over the content and effect of the application of this concept. As scholar Ricky Lee explains, the industrialised states did not want to be part of any intergovernmental system that set a precedent for international taxation, while the

developing states did not want to be part of an agreement that did not clarify the extent of their rights and benefits derived from the common heritage of mankind (Lee, 2012, pp. 318–319), noting that the international regime governing the exploitation is yet to be established.

Particularly, American commentators were concerned about the Moon Treaty's effect on prospective space operations of the United States, as the treaty postpones the commercial exploitation of lunar resources pending the establishment of the international regime (Griffin, 1981, p. 750). Consequently, several special interest groups within the United States, such as the L-5 society, lobbied against the Moon Treaty on the grounds that its provisions are extremely detrimental to the free enterprise system and would have negative effects on the future of the United States in space (Griffin, 1981, pp. 749–750; U.S. Office of Technology Assessment, 1981, p. 159). Clearly, the treaty entails principles which are unfavourable to the economic interests of space-faring states.

The Law of the Sea Treaty

The exclusive economic zones (EEZs) of the Law of the Sea Treaty are considered to be one of the most generous and innovative provisions of the treaty, granting coastal nations the full right to exploit, manage and protect all resources to be found in the waters, on the ocean floor and in the subsoil of an area extending 200 miles from their shore (Ashfaq, 2008, p. 364; “The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998). As the term “exclusive” implies, third countries are excluded from such activities, which is economically significant for coastal states, since approximately 90 per cent of all commercially relevant fish species are located in the EEZs (Bollmann et al., 2010, p. 204). Nonetheless, territorial claims by coastal states to the zone are not allowed and all states can navigate the zones and lay submarine cables and pipelines there (Bollmann et al., 2010, p. 205).

However, continental shelves are considered to be the economically most valuable part of the ocean (Alvarez, 1947, pp. 406–409), and therefore provisions related to the continental shelves matter greatly to the relative gains assumption. Article 82 of the Law of the Sea Treaty establishes an international ‘servitude’ in the form of an annual payment to be made by coastal states to the International Seabed Authority for the exploitation of the non-living resources in the continental shelf (International Seabed Authority, 2009, p. 7). The authority disburses those payments and contributions to state parties “on the basis of equitable sharing criteria, taking into account the interests and needs of developing states,

particularly the least developed and the land-locked among them” (International Seabed Authority, 2009; “United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 55). Since, without the treaty, coastal nations have no such obligations, the relative economic power of coastal nations decreases in this regard compared to land-locked countries. For land-locked countries, however, this provision improves their economic position, as they receive economic benefits they would otherwise not receive. Furthermore, the Law of the Sea Treaty grants land-locked countries the right to participate in the exploitation of an appropriate part of the surplus of the living resources in the exclusive economic zones of coastal states (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 49), hereby further improving their economic position.

5.1.1.1 Relative gains assumption: confirmed or disconfirmed?

From the evidence can be concluded that the Moon Treaty brings relative losses to countries with space programmes and relative gains to countries without a space programme, as countries capable of mining would have to share what they mined with other states. Ultimately, I would expect from this evidence that the majority of countries that did ratify the Moon Treaty did not have a national space programme or agency at the time of ratification. The results are captured in Table 4 and confirm this expectation, since eight of the seventeen countries had no space programme at the time of ratification, and several agencies of the countries that did have a national space programme at the time of ratification, have no space capabilities at all.

Table 4: Space programmes at time of ratification of the Moon Treaty

Countries	National space programme or agency	Space capability
Australia	None	
Austria	Yes, since 1972	None
Belgium	None	
Chile	None	
Kazakhstan	None	
Kuwait	None	
Lebanon	None	
Mexico	None	
Morocco	Yes, since 1989	None
Netherlands	Yes, since 1983	Yes, astronauts and satellites
Pakistan	Yes, since 1961	Yes, satellites and sounding rockets
Peru	Yes, since 1974	Yes, satellites and sounding rockets
Philippines	None	
Saudi Arabia	Yes, since 1977	Yes, satellites
Turkey	Yes, since 1985	Yes, astronauts and satellites
Uruguay	Yes, since 1975	None
Venezuela	Yes, since 2008	Yes, satellites

Source: (“*List of Government Space Agencies,*” 2017)

With regard to the Law of the Sea Treaty, the analysis showed that the treaty brought relative economic gains to both coastal nations and land-locked nations. Despite the annual payment obligation, the exclusive right of coastal nations to exploit resources in their EEZs and continental shelves is extremely important, since it frees them from the necessity to make excessive claims of historic waters or territorial sea, and therefore the treaty was popular among them (Bernard, 2016). I would expect from this evidence that the Law of the Sea Treaty would be popular among both coastal nations and land-locked countries. Considering that most land-locked countries signed the treaty and the only major coastal nation that did not sign the Law of the Sea Treaty is the United States (See Appendix III; Tziarras, 2012, p. 3), the expectation is correct. Therefore, the evidence shows that the relative gains assumption is highly relevant.

5.1.2 Balance-of-power threat

Based on theory, my assumption is that treaties affecting the balance-of-power have a higher or lower chance of succeeding, depending on the state’s power. Developing states are more likely to participate in treaties that ameliorate the balance-of-power, whereas powerful states are less interested in treaties that equalize the balance-of-power.

The Moon Treaty

The common heritage of mankind principle aims to ensure developing countries' participation in the governance and exploitation of resources in the seabed and outer space, and prevents powerful countries to monopoly on these areas (Siavash, 2017, p. 103). Not surprisingly, the concept has been opposed by developed countries, particularly major space powers (Siavash, 2017, p. 105). The major political opposition concerns the equitable sharing provision, which according to critics, requires states to surrender vital sovereign powers and radically alters the political structure of international society (Siavash, 2017, pp. 105–106). In fact, Ambassador Arvid Pardo, the founder of the common heritage of mankind principle, stated that the principle challenges relationships between developed and developing countries, and revolutionizes international relations as a whole (Siavash, 2017, p. 106).

The Moon Treaty's provisions regarding the international regime governing space activities would have the most substantial impact on the space programmes of the United States (U.S.) and the Soviet Union (Griffin, 1981, p. 749), and both states expressed concerns related to balance-of-power. During the Moon Treaty negotiations, the Soviet Union feared that the treaty would establish an undesirable supra-state body, which would infringe upon the sovereign rights of states (U.S. Office of Technology Assessment, 1981, p. 159). American critics argued that the guidelines for the regime are unclear to the extent that they can easily be manipulated to allow developing countries to extract taxes, impose controls and limitations, and obtain special rights and privileges at the expense of powerful states (Griffin, 1981, p. 750). Critics also argued that the treaty gives other countries tremendous political control in regulating or prohibiting commercial exploitation (Griffin, 1981, p. 753), and therefore, space-faring powers could be denied access to valuable lunar resources (Griffin, 1981, p. 749).

The Law of the Sea Treaty

The Law of the Sea Treaty established an International Seabed Authority (ISA) to deal with the control and management of the seabed's resources. Some of the issues that arose in the negotiations concerned the composition of the Council of the International Seabed Authority, the distribution of power, and the procedures for taking decisions (Hossain, 1980, p. 163). At the time, the developing countries argued that the only acceptable principle in decision-making is "one state, one vote," as the concepts of veto power, permanent members, and weighted voting are from the past (Hossain, 1980, p. 163). The

industrialized states, however, argued that decisions taken by the United Nations General Assembly are non-binding and barely impact the economic behaviour of states and private entities, whereas decisions taken by the Council of the International Seabed Authority will have a major impact on the economic behaviour of states and private entities. Therefore, the industrialized states wanted states with greater economic interests in seabed mining to have proportionate power in the Council (Hossain, 1980, p. 163). The final agreement did balance out the interests of both the industrialised states and the developing states.

The Assembly is the supreme authority of the ISA and is composed of all parties to the treaty. The Assembly is responsible for setting general policies, establishing the budgets, and electing the ISA's 36-member Council, which serves as the executive organ (International Seabed Authority, 2017). The Council establishes specific policies and supervises the implementation of the regime. The Council also draws up the terms of the contracts, approves contract applications, oversees implementation of the contracts, and establishes environmental and other standards (International Seabed Authority, 2017).

To ensure an equitable representation of a variety of regional and economic interests, the Council is comprised of five different chambers: (1) the first chamber consists of four major consumers of the metals derived from seabed mining; (2) the second chamber consists of four major investors in seabed mining; (3) the third chamber consists of four major exporters of the metals derived from seabed mining; (4) the fourth chamber consists of six developing states with special interests (including states with large populations, small island developing states, and land-locked and geographically disadvantaged states); and (5) the fifth chamber consists of eighteen states elected on the basis of equitable geographic distribution, representing Africa, Asia, Eastern Europe, Latin America, the Caribbean and Western states (*The International Seabed Authority: Structure and Functioning*, 2009). Each member of the Council has one vote and decision-making is done by consensus (*Rules of Procedure of the Council of the International Seabed Authority*, 2017, pp. 14–15). However, if consensus cannot be reached, decisions are passed with two-thirds majority of the Council members, as long as the decision is not opposed by a majority in one of the five chambers (*Rules of Procedure of the Council of the International Seabed Authority*, 2017, p. 15).

5.1.2.1 Balance-of-power threat assumption: confirmed or disconfirmed?

From the evidence can be concluded that the Moon Treaty decreases the political power of space-faring powers, while increasing the political power of developing countries. The provision on equitable sharing aims to alter the existing balance-of-power in the

international arena to the benefit of developing states. Since the international regime governing the mining of space resources has yet to be established, the implications of the treaty are unclear, which has led to suspicions of powerful space-faring states. However, since the agreement also does not clarify the extent of developing nations' rights and benefits derived from the common heritage of mankind principle, the treaty has not been popular among them either (Lee, 2012, pp. 318–319). From this evidence, I would expect that the treaty would not be ratified by powerful states with space capabilities or developing nations, which is the case (see Table 4).

Regarding the Law of the Sea Treaty, due to the make-up and voting procedures in the ISA, it seems that the Law of the Sea Treaty does not pose a threat to the political power of powerful states, as all influential players hold key positions in all of the ISA's bodies, as well as have a say in all of the major decisions (González-Ricoy & Gosseries, 2017, p. 208). At the same time, special interests of developing states and geographically disadvantaged states are also represented in the Council and thus, the treaty improves the political power of developing states and land-locked countries as well. I would expect from this evidence that both powerful states and land-locked states ratified the Law of the Sea Treaty, which – disregarding the United States – is true. Therefore, the evidence shows that the balance-of-power threat assumption is highly relevant.

5.1.3 Common threat

Based on theory, my assumption is that states cooperate in general when there is a perceived threat. States are likely to participate in treaties that bring solutions to a common threat; however, if the treaty does not address a common threat, states are not likely to participate in that treaty.

The Moon Treaty

Since space science and technology were progressing at a rapid pace in the 1960's, the Outer Space Treaty's provisions were developed. After the Outer Space Treaty took effect in 1967, portions of the treaty were expanded in three supplemental agreements: the 1968 Rescue and Return Agreement, the 1973 Liability Convention, and the 1979 Registration Convention (Griffin, 1981, p. 734). The moon landing by the U.S. in 1969 and the discovery of natural resources on the moon increased the desire of the international community to establish a more specific framework for activities on the moon (Al-Rodhan, 2012). Eventually, proposals submitted by Argentina and the Soviet Union led to the decision to

formulate an agreement governing man's activities on the moon (Griffin, 1981, p. 734). Argentina pointed out that the use of the moon's natural resources had already begun and that the Outer Space Treaty did not include specific regulations to this end (Committee on Commerce Science and Transportation, 1980, p. 7). However, when the draft treaty was formulated by the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, there were conflicting opinions over the scope of the treaty, provisions regulating information exchange and natural resource exploitation (Griffin, 1981, pp. 734–735).

The Law of the Sea Treaty

Historically and traditionally, the oceans have been subject to what is called the freedom-of-the-seas doctrine, which limits national rights and jurisdiction over the oceans to three-miles of sea surrounding a nation's coastline, the remainder of the sea being free to all nations and belonging to none ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998). However, in the 1940's, the hazard of pollution, growing competition for fish stocks, increasing tensions between coastal nations and land-locked countries regarding the rights to these resources, the outlook of a rich harvest of resources on the seabed, as well as an outdated and conflicting freedom-of-the-seas doctrine, threatened to transform the oceans into another arena of instability and conflict ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998).

This situation exuberated in 1945, when U.S. President Harry Truman extended United States jurisdiction over all natural resources on the nation's continental shelf due to pressures from domestic oil interests, hereby challenging the freedom-of-the-seas doctrine in a way never happened before ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998). In the following years, other countries followed suit and asserted sovereign rights over zones exceeding the traditional three-mile limit, with several countries even asserting rights over a 200-mile zone ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998). Consequently, up until the 1970's, the oceans were generating a multitude of claims, counterclaims and sovereignty disputes ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998), and consequently, the possibility of use of force and confrontations increased (Hudson, 1977, p. 20).

Additionally, the global consensus seemed to replace the 3-mile limit with a 12-mile limit as customary law, which would eradicate free transit through 116 major straits (Hudson, 1977, p. 20) and lead to a multitude of problems. First, each nation could enact

its own pollution standards and controls, which could easily lead to confusion and violence among states. Second, countries would rely on their own forces to find out if their fish or seabed resources are not poached and their sovereign rights breached. Lastly, even if a country found any transgressors, it would have no legal recourse against them. With all these issues arising, a wide variety of maritime arms races and collisions were to be expected (Hudson, 1977, p. 20). Recognizing the need to update the freedom-of-the-seas doctrine, in 1967, Malta's Ambassador to the United Nations called for "an effective international regime over the seabed and the ocean floor beyond a clearly defined national jurisdiction" ("The United Nations Convention on the Law of the Sea: A Historical Perspective," 1998).

5.1.3.1 Common threat assumption: confirmed or disconfirmed?

From the evidence can be concluded that a common threat was not present prior to the establishment of the Moon Treaty. In fact, the treaty was criticized for being out of scope, since lunar exploitation was not expected to be feasible for the next few decades (Griffin, 1981, pp. 734–735). My expectation would be that, since there was no common threat, the treaty is not likely to succeed. Considering the outcome of the Moon Treaty, this prediction is correct. On the contrary, from the evidence regarding the Law of the Sea Treaty, it can be concluded that a common threat was present prior to the establishment of the treaty, and the threat was only possible to be resolved through a legal framework treaty. From the low amount of ratifications for the Moon Treaty and the large amount of ratifications for the Law of the Sea Treaty can be concluded that the common threat assumption is highly relevant.

5.1.4 Hegemon participation

Based on theory, my assumption is that when a hegemon participates in a treaty, other states will follow. However, if the hegemon does not participate in a treaty, there is no strong leadership, and other states will not likely participate in the treaty.

The Moon Treaty and the Law of the Sea Treaty

Scholar Robert Cox characterizes the 1945 to 1965 period as a time of clear American hegemony, while the period after 1965 saw the rise of counter-hegemonies (Cox & Sinclair, 1983, p. 60; Melchin, 2015, p. 144), which was notable with the inclusion of the common heritage of mankind principle in the Moon Treaty, hereby taking the interests of decolonizing nations into account (Melchin, 2015, p. 147). Despite these developments, the

U.S. is still regarded as the hegemon at that time, which is confirmed by the country's strong role in the negotiation process of the treaty (Griffin, 1981, p. 759). However, although the U.S. held a strong role in formulating and negotiating the treaty, the U.S. did not ratify the agreement.

Likewise, despite the U.S. active participation in the negotiations of the Law of the Sea Treaty, the country did not ratify the agreement. In March of 1983, the then U.S. President Ronald Reagan released a statement:

“Last July I announced that the United States will not sign the United Nations Law of the Sea Convention that was opened for signature on 10 December. We have taken this step because several major problems in the Convention's deep sea-bed mining provisions are contrary to the interests and principles of industrialized nations and would not help attain the aspirations of developing countries. The United States does not stand alone in those concerns. Some important allies and friends have not signed the Convention. Even some signatory states have raised concerns about these problems” (*Statement by the President, 1983*).

Notably, traditional U.S. allies, Israel and Turkey, have not ratified the agreement. Consequently, it is argued that a possible future ratification by the U.S. would have implications for these states (Tziarras, 2012, pp. 3–5). Scholar Zenonas Tziarras mentions that, politics play a crucial role in impacting the manner in which states choose to implement or support international law (Tziarras, 2012, p. 10). From that perspective, Tziarras argues that U.S. ratification of the treaty would likely influence policy decisions of other states that would either bandwagon with the U.S., or take advantage of the development in light of their own interests (Tziarras, 2012, p. 10).

5.1.4.1 Hegemon participation assumption: confirmed or disconfirmed?

The Moon Treaty was not ratified by the U.S., and since the U.S. was the hegemon at the time, I would expect that the treaty outcome would not be successful, which in this case, is true. With regard to the Law of the Sea Treaty, the analysis showed that hegemonic participation did not influence the outcome; however, according to Tziarras, it did influence the decision of traditional U.S. allies, Turkey and Israel to not ratify the agreement. Nonetheless, the fact that Turkey ratified the Moon Treaty, whereas the U.S. did not, undermines this argument. Therefore, the hegemon participation assumption is not highly relevant.

5.1.5 High/low politics

Based on theory, my assumption is that treaties that concern high politics have a higher chance of failing than do treaties concerning low politics.

The Moon Treaty and the Law of the Sea Treaty

All state action related to the national pursuit of security and power, and generally concerning a state's survival, are included under the high politics umbrella; whereas, the area of low politics concerns issues not relating to the survival of a state. Examples of low politics issues are trade, economic welfare, the environment, societal matters, and culture (Pusterla, 2016, p. 83). Generally, space is considered to be a security-sensitive policy domain, as it directly touches upon states' security and strategic commercial interests (Wang, 2013, p. 15). However, since the Moon Treaty is mainly about mining (i.e. an economic activity), it falls under the low politics umbrella. Likewise, seabed exploitation is considered to be a low politics issue (Jervis, 1982, p. 358). Nonetheless, Jervis does indicate that there is a thin line between issues of security and issues like seabed exploitation (Jervis, 1982, p. 358). Not surprisingly, "[n]ational security interests were paramount in crafting the final text of the [treaty]" (Kraska, 2007, p. 547).

5.1.5.1 High/low politics assumption: confirmed or disconfirmed?

Since the Moon Treaty concerns low politics, I would expect the treaty to be successful, which is not true. Regarding the Law of the Sea Treaty, the issue concerns low politics, and therefore, I expect the treaty to have a higher chance of succeeding. Due to the high rate of ratifications of the Law of the Sea Treaty, but the low rate of the Moon Treaty, the high/low politics assumption is not highly relevant.

5.1.6 Competition control

Based on theory, my assumption is that treaties that control competition and set up rules and procedures for this end, have a higher chance of succeeding.

The Moon Treaty and the Law of the Sea Treaty

The Outer Space Treaty governs major aspects of outer space activities, yet does not address commercial activities. Although, the Moon Treaty attempted to close this gap by establishing that an adequate international regime for space mining must be established, it did not set up clear rules and procedures for this regime, for the reason that this regime

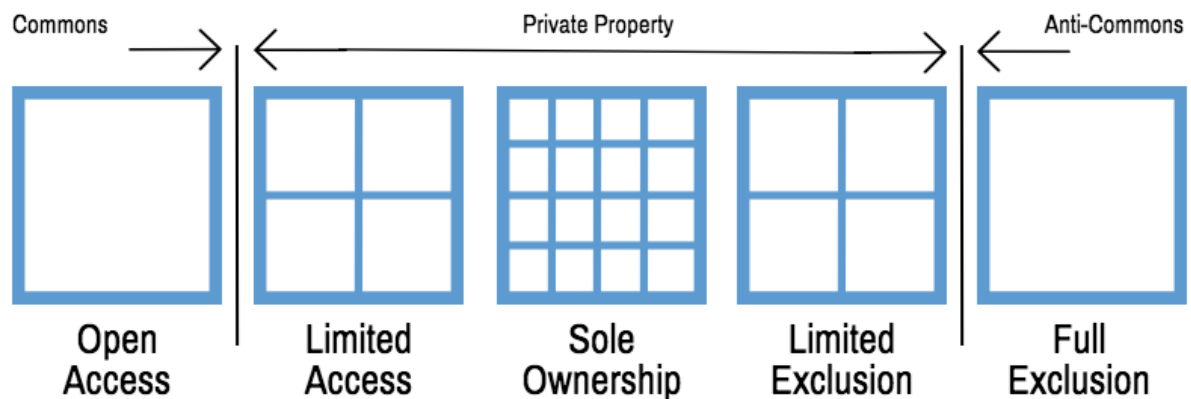
should be established when space mining is feasible (United Nations Office for Outer Space, 2005, p. 351). As mentioned earlier, the vagueness of the treaty led it to be unpopular among both space-faring nations and developing countries (Griffin, 1981, p. 750).

On the contrary, the Law of the Sea Treaty does set up clear rules and procedures for seabed exploitation, an area which lacked international regulation (Dalton, 2010, p. 22). As mentioned in the literature review, the Law of the Sea Treaty contains 302 articles governing all aspects of ocean space, including delimitation, environmental control, scientific research, economic and commercial activities, and the settlement of disputes (United Nations Office of Legal Affairs, 2017). Especially, in regard to the governance of global commons, it is of utmost importance that clear legal rules are established to regulate competition and avoid overexploitation or under-exploitation.

Resources of uncertain value, such as the resources in outer space, are particularly susceptible to the anti-commons problem, that is, they will be underexploited. The boundaries of different types of ownership can be seen in Figure 1. The vertical lines represent the range of private property types typically available in a society. Outside the left boundary, in open-access commons, many people own valuable rights to use a resource, such as fish in the ocean and resources in outer space. Outside of the right boundary, in full-exclusion anti-commons, many people own valuable rights to exclude others from a resource. In the case of open-access commons, resources are overexploited, whereas in the case of full exclusion anti-commons, resources are underexploited (Heller, 1999, pp. 1166–1167). Well-functioning property regimes prevent such waste by drawing boundaries that clearly outline how actors have to share the property (Heller, 1999, p. 1166).

Since there are no clear guidelines for the establishment of the regime governing the exploitation of the moon's resources, the moon's resources are susceptible to under-exploitation, as space-faring countries are discouraged to mine. Only if the benefits of participation in the treaty are large enough, thereby outweighing the costs by a large margin, countries will participate in the treaty (Landry, 2013, p. 528). However, since each state has an equal right to the benefits derived from outer space, and because national sovereignty is prohibited, no state seems to be willing to bear the enormous cost of exploitation. This problem is exacerbated, because the benefits of the use of outer space will be difficult to measure until commercialization begins (Landry, 2013, p. 528). The Law of the Sea Treaty solves the anti-commons problem by dividing up the ocean in maritime zones and granting coastal states exclusive economic zones, where other states are not allowed to conduct commercial activity, unless the state licenses or rents the area.

Figure 1: Heller's boundaries of private property



Source: Own illustration, based on Heller's boundaries of private property (Heller, 1999, p. 1167)

5.1.6.1 Competition control assumption: confirmed or disconfirmed?

Due to the lack of rules and procedures mentioned in the Moon Treaty, the Moon Treaty does not adequately control the exploitation of resources and therefore, I would expect the treaty to not be successful – which is true. However, the Law of the Sea Treaty does set up clear rules and procedures for seabed exploitation, and therefore, I would expect the treaty to be successful – which is also the case. Ultimately, the evidence shows that the competition control assumption is highly relevant.

5.2 Liberal institutionalism

5.2.1 Absolute gains

Based on theory, my assumption is that a state that gains from a treaty, is likely to participate in such a treaty, whereas a state that does not have any gains from a treaty, is not likely to participate in such a treaty.

The Moon Treaty

Proponents of the Moon Treaty assert that the Moon Treaty is a meaningful advance in international space law, as “without the appropriate legal framework in which to conduct space exploration, [...] the moon could easily become the source of international conflict, thereby causing a highly unstable environment for public or private investment” (Griffin, 1981, p. 758). Both the Outer Space Treaty and the Moon Treaty contain provisions de-weaponising and demilitarising the moon and establishing that the moon shall be explored

and used exclusively for peaceful purposes the moon. However, only the moon treaty specifically and expressly prohibits any threat, use of force or other hostile act on and from the moon, which according to proponents is one of the most important factors for attracting significant financial investment and conducting commercial operations smoothly. Thus, the Moon Treaty offers additional protection against hostility and use of force to the states and companies that engage in lunar exploration and exploitation (United Nations Office for Outer Space, 2005, pp. 349–350). At the same time, non-space powers that ratify the Moon Treaty also enjoy enhanced security from any hostility and use of force carried out against them by states from the moon. Therefore, proponents argue that the Moon Treaty is a significant improvement over the regime established under the Outer Space Treaty (United Nations Office for Outer Space, 2005, p. 351).

Despite these arguments, it seems fair to accept that the gains of the Moon Treaty do not outweigh the losses for space-faring powers. The burden for these powers to share with other states the benefits derived from their space activities significantly decreases their economic incentives to engage in such activities. For states without space programmes, however, this treaty brings more gains than losses due to its application of the common heritage of mankind principle to space resources, hereby accommodating their interests by preventing state-faring powers to monopoly on outer space.

The Law of the Sea Treaty

The Law of the Sea Treaty grants coastal nations benefits by establishing exclusive economic zones which give them the exclusive right to explore, exploit, protect and manage the resources of an area containing valuable resources (Ashfaq, 2008, p. 364). Furthermore, the treaty solves the territorial water disputes, by establishing universal maritime zones and the right of transit passage. Despite the requirement of an annual payment in regarding to activities in the continental shelves, these gains seem to outweigh the losses for coastal nations.

Land-locked countries and geographically disadvantaged states also benefit from the Law of the Sea Treaty: (1) land-locked states have access rights to and from the sea and freedom of transit; (2) land-locked states and geographically disadvantaged states enjoy rights of access to fisheries; (3) land-locked countries and geographically disadvantaged states receive payments from coastal nations' exploitation of the continental shelf beyond the 200-mile limit; (4) land-locked countries and geographically disadvantaged states are represented on the Council of the International Seabed Authority; and (5) the Law of the

Sea Treaty grants land-locked countries and geographically disadvantaged states the right to participate equitably in the exploitation of an appropriate part of the surplus of the living resources in the exclusive economic zones of coastal states (Alexander, 1981, p. 190; “United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 49). Furthermore, in the high seas – which are beyond the sovereignty of any country – land-locked countries enjoy equal rights as coastal states (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 57).

However, as scholar Endalcachew Bayeh rightfully observed, land-locked states’ rights of access to and from the seas and freedom of transit are not absolute, as the Law of the Sea Treaty requires these to be handled through bilateral and multilateral agreements between the land-locked and coastal states concerned, making the practical implementation of land-locked states’ rights dependent on the states’ relations, agreements, and the political will of transit states (Bayeh, 2015, p. 30). A relevant example is Ethiopia’s denial of access to the port of Assab (where 75% of Ethiopian trade passed through duty-free until 1997) following its conflict with Eritrea (Bayeh, 2015, p. 29). Nonetheless, I would still argue that the gains of the Law of the Sea Treaty outweigh the losses for land-locked states, especially since land-locked countries would otherwise not have a chance to develop this kind of maritime industry.

5.2.1.1 Absolute gains assumption: confirmed or disconfirmed?

From the evidence can be concluded that the Moon Treaty does not bring absolute gains to countries with a space programme. I would assume that the treaty would not be popular among space-faring powers – which is the case. The fact that a multiple of countries that signed the agreement did not have a space programme at the time of ratification, also collaborates with my expectation. Concerning the Law of the Sea Treaty, the evidence concludes that the Law of the Sea Treaty brings absolute gains to both coastal nations and land-locked countries, due to the fact that coastal nations are granted exclusive rights to exploit resources and land-locked states enjoy beneficial navigational rights and have the opportunity to develop maritime industry. Therefore, I would assume that the treaty has a successful outcome – which is the case. All in all, the absolute gains assumption is highly relevant.

5.2.2 *Transaction costs*

Based on theory, my assumption is that a state is likely to participate in a treaty that reduces transaction costs associated with rule-making, negotiating, implementing, enforcing, information gathering and conflict resolution. However, a state is not likely to participate in treaties where transaction costs are negligible or extremely high.

The Moon Treaty and the Law of the Sea Treaty

International transactions with relatively low transactions costs should be undertaken via relatively simple negotiated agreements without any need to create an international regime, whereas international transactions with high relative transactions costs, should take place within international institutions, if the relative transactions costs of creating them are small (Gilligan, 2009, pp. 8–9). States may be willing to pay enormous transactions costs if the value of the treaty they are negotiating is even more enormous, and negligible transactions costs may be sufficient to induce states to forgo negotiations altogether if the expected value of the treaty is sufficiently small (Gilligan, 2009, pp. 8–9). The question is then, are the transaction costs worth the value of the treaty? In regard to the Moon Treaty, the value of the treaty is low to both space-faring countries and developing countries. No space-faring state is willing to bear the costs of mining resources in space that will be shared equitably among states, and developing countries do not want to be part of a treaty that does not explicitly states what their benefits are. Ultimately, the transaction costs of the treaty are high, due to the vagueness of the treaty, especially in regard to the international regime which would govern activities in space.

Unlike the Moon Treaty, however, the Law of the Sea Treaty has high value and lays out an adequate legal framework that reduces transaction costs. Due to the success of this regime, scholar Rosanna Sattler even proposed applying the exclusive economic zone system to outer space (Landry, 2013, p. 544). Sattler would allow each state to build a structure on a celestial body and allow them to claim up to a certain amount of area surrounding their structure for their use, where they retain jurisdiction to implement their own regulations and permitting procedures (Landry, 2013, p. 544).

5.2.2.1 **Transaction costs assumption: confirmed or disconfirmed?**

From the evidence can be concluded that the transaction costs associated with the Moon Treaty are high, since the treaty does not provide clear guidelines for the establishment of the regime governing the exploitation of the moon's resources, leaving much uncertainty.

From the analysis, I would expect for the Moon Treaty not to be successful – which is the case. Regarding the Law of the Sea Treaty, transaction costs are not high, as the treaty provides for an adequate legal framework and clear divisions of property rights in the ocean. Consequently, I would expect for the Law of the Sea Treaty to be successful – which is the case. Therefore, the transaction costs assumption is highly relevant.

5.2.3 *Institutional participation*

Based on theory, my assumption is that a state that participates in treaties becomes more cooperative; hence, they are in general more likely to join treaties, as compared to a state that does not participate in treaties.

The Moon Treaty

My assumption entails that when countries already have successful established bilateral agreements regarding an area of governance, those countries are more likely to sign another agreement relating to that area. Regarding the governance of outer space, there were four United Nations treaties concerning outer space prior to the establishment of the Moon Treaty, as noted in Table 5.

Table 5: United Nations treaties concerning outer space

Year	Treaty	Ratifications
1967	Outer Space Treaty	105
1968	Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space	95
1972	Convention on International Liability for Damage Caused by Space Objects	94
1975	Convention on Registration of Objects launched into Outer Space	63
1979	Moon Treaty	17

Source: (“Multilateral Treaties Deposited with the Secretary-General,” 2017a)

Interestingly enough, the vast majority of countries that did ratify the Moon Treaty, also ratified all the other treaties relating to outer space, as can be seen in Table 6 below. However, not all countries that ratified all the previous treaties, ratified the Moon Treaty (United Nations Committee on the Peaceful Uses of Outer Space, 2017, pp. 5–12). Besides the fourteen countries listed in Table 6 below, there are 37 other countries that ratified all previous four treaties, but did not ratify the Moon Treaty.

Table 6: Institutional participation of Moon Treaty signatories

	1967 Treaty	1968 Treaty	1972 Treaty	1975 Treaty	1979 Treaty
Australia	R	R	R	R	R
Austria	R	R	R	R	R
Belgium	R	R	R	R	R
Chile	R	R	R	R	R
Kazakhstan	R	R	R	R	R
Kuwait	R	R	R	R	R
Lebanon	R	R	R	R	R
Mexico	R	R	R	R	R
Morocco	R	R	R	R	R
Netherlands	R	R	R	R	R
Pakistan	R	R	R	R	R
Peru	R	R	R	R	R
Philippines	S	S	S		R
Saudi Arabia	R		R	R	R
Turkey	R	R	R	R	R
Uruguay	R	R	R	R	R
Venezuela	R	S	R	R	R

* “R” means the country ratified the treaty and “S” means the country signed the treaty.

Source: (United Nations Committee on the Peaceful Uses of Outer Space, 2017)

The Law of the Sea Treaty

Regarding the governance of the seas, there were five United Nations treaties prior to the United Nations Convention on the Law of the Sea, all of which attracted lower ratifications compared to the Law of the Sea Treaty, as can be seen in Table 7.

Table 7: United Nations treaties concerning the high seas

Year	Treaty	Ratifications
1958	Convention on the Territorial Sea and the Contiguous Zone	52
1958	Convention on the High Seas	63
1958	Convention on Fishing and Conservation of the Living Resources of the High Seas	39
1958	Convention on the Continental Shelf	58
1958	Optional Protocol of Signature concerning the Compulsory Settlement of Disputes	38
1982	Law of the Sea Treaty	168

Source: (“Multilateral Treaties Deposited with the Secretary-General,” 2017b)

5.2.3.1 Institutional participation assumption: confirmed or disconfirmed?

The evidence shows that institutional participation did not play a big part in the outcome of the Moon Treaty. Previous United Nations treaties concerning outer space have attracted large numbers of ratifications, yet the Moon Treaty was not successful. Institutional participation does seem to play a role to some extent, as fourteen out of the seventeen countries that ratified the Moon Treaty, ratified all previous four United Nations treaties. Nonetheless, the 37 countries that also ratified the previous four countries did not sign the Moon Treaty. Regarding the Law of the Sea Treaty, institutional participation also does not seem to have played a huge role, as a multitude of countries that did not sign the previous treaties, signed the Law of the Sea Treaty. Therefore, the institutional participation assumption is not highly relevant.

5.2.4 *Legal framework demand*

Based on theory, my assumption is that when there is a lack of a clear legal framework establishing liability for actions, states are likely to join treaties that establish such a framework. However, if there is not a demand, the treaty will not be successful.

The Moon Treaty

As mentioned in Chapter 5.1.3, proposals submitted by Argentina and the Soviet Union led to the formulation of the Moon Treaty. In 1970, Argentina submitted to the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS), a draft agreement concerning the use of the moon's natural resources (Griffin, 1981, p. 734), pointing out that the use of the moon's natural resources had already begun and that the Outer Space Treaty did not include specific regulations to this end (Committee on Commerce Science and Transportation, 1980, p. 7). In 1971, the Soviet Union submitted its own draft treaty to the General Assembly that dealt with navigational matters relating to lunar exploration. In response to the draft, the General Assembly adopted Resolution 2779 which formally requested that the Legal Subcommittee of COPUOS consider the development of a draft treaty as a matter of high priority and report on this draft the following year (Griffin, 1981, pp. 734–735). Consequently, at its 1972 session, the Legal Subcommittee formulated a draft treaty, but was unable to reach a final consensus, due to conflicting opinions over the scope of the treaty, provisions regulating information exchange and natural resource exploitation.

The delay was primarily caused by the refusal of the Soviet Union to accept the provision that the moon and its resources are the common heritage of mankind (Griffin, 1981, pp. 734–735), and the inclusion of this principle created the greatest controversy among legal subcommittee members throughout the negotiating period, as the members could not agree on whether provisions relating to natural resources should be included in the treaty at all. The Soviet Union argued that the inclusion of provisions concerning their use would be premature, on the basis that the exploitation of lunar resources would not be practical or economically feasible for many decades. Consequently, the Soviet Union argued that the use of lunar resources should be discussed in a separate treaty at a later time (Griffin, 1981, pp. 734–735). Clearly, there was not a demand for the establishment of a regime for lunar exploitation, as even the treaty entails that the international regime to govern lunar exploitation should be established *as soon as such exploitation becomes feasible* (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 79; Griffin, 1981, pp. 743–744). At the time of the negotiations, space mining equipment had not even been developed (U.S. Office of Technology Assessment, 1981, pp. 758–759).

Furthermore, in a memorandum responding to a U.S. State Department report favourable to the Moon Treaty, the L-5 Society noted that most of the potential benefits included in the Moon Treaty, are already contained in the other treaties dealing with outer space, and thus, the Moon Treaty adds very little practical value to the existing body of space law. According to the society, the enormous sacrifice that would be required of the U.S. in regard to future economic interests in space development, far outweighs the marginal advances which might be made in a few provisions (Griffin, 1981, p. 754).

The Law of the Sea Treaty

In the years following the 1958 Law of the Sea Conference, the number of coastal states claiming a territorial sea of three nautical miles or less dropped from 54 to 35 percent, whereas the number of coastal states claiming territorial extensions of 12 nautical miles or more increased from 18 to 43 percent (Elferink, 2005, p. 31). Many Latin American and African countries started making claims to broad territorial seas and fishing zones, with some claiming patrimonial seas of up to 200 nautical miles (Beckman & Davenport, 2012, p. 4). As mentioned in Chapter 5.1.3, this pattern threatened to close more than 100 straits, making them subject to the rules of innocent passage rather than the traditional freedom of transit (Elferink, 2005, p. 31). The United States and the Soviet Union were concerned

about the impact of these increasing jurisdictional claims by coastal states, on the freedom of navigation on the high seas and through international straits, and consequently were prime movers for the Law of the Sea Treaty (Elferink, 2005, p. 31).

In 1967, the United States and the Soviet Union proposed to other United Nations member countries that an international conference should be held to deal specifically with the entangled issues of straits, overflight, the width of the territorial sea and fisheries. The new concept that emerged, known as “transit passage”, required concessions from both sides (“The United Nations Convention on the Law of the Sea: A Historical Perspective,” 1998). However, the issue of passage was not the only driving force behind the Law of the Sea Treaty. The discovery of rich minerals on the deep seabed, led Kenya to put forward the concept of exclusive economic zones to the United Nations Seabed Committee in 1972, a concept largely supported by developing states as they sought to have more control over their economic resources, specifically their fish stocks, which they felt to be under increasing exploitation of distant-water fleets of developed states (Beckman & Davenport, 2012, p. 4). As scholar Nico Schrijver argues, “for too long the inexhaustibility and the infinite use of global resources were the underlying operating assumptions, resulting in a serious decline in global resources and even the extinction of some” (Schrijver, 2016, pp. 1259–1260).

5.2.4.1 Legal framework assumption: confirmed or disconfirmed?

Due to the fact that space mining equipment was not yet established and the exploitation of the national resources of the moon was not expected to happen in several decades from the negotiations, I conclude that there was not a demand for a legal framework regulating commercial activities on the moon. Regarding the Law of the Sea Treaty, there was a clear demand for a legal framework at the time of the enactment of the Law of the Sea Treaty. A multitude of conflicting territorial claims, discoveries of resources on the deep seabed, as well as the desire of developing states to have more control over their resources, all motivated the establishment of the Law of the Sea Treaty. Taken the fact that the Moon Treaty was not successful and the Law of the Sea Treaty was successful, the legal framework assumption has high relevance.

5.2.5 Information demand

Based on theory, my assumption is that states are likely to participate in treaties if they improve the quality and quantity of information available to the states involved, since this

helps to coordinate the states' expectations. However, if there is no demand for high-quality information or if the treaty does not improve the quality and quantity of information available to the states involved, states are not likely to participate in the treaty.

The Moon Treaty

Regarding information, the Moon Treaty requires states to make thorough and timely reports on their scientific investigations. Although, the Outer Space Treaty also requires state parties to share such data, critics have pointed out that the United States and Soviet Union have been slow to do so in the past. Under the Moon Treaty, parties have a duty to inform the United Nations Secretary General, as well as the public, of the time, purposes, location, duration, orbital parameters and results of each mission to the moon (United Nations, 2002). However, some commentators have noted that, unlike the Outer Space Treaty, the Moon Treaty does not require the Secretary General to disseminate this information (Griffin, 1981, p. 739).

Although, the member of the Legal Subcommittee agreed on the type of information to be provided, the timing of the dissemination of the information was one of the major issues that arose during the negotiations; the United States proposed that parties intending to conduct activities on the moon should be required to supply the required information no later than sixty days before launching, while the Soviet Union argued that it did not want to commit itself to delivering information that could be obsolete on the day of launching. Eventually, the members agreed that the information shall be disseminated as soon as possible after launching and that information on the results shall be disseminated upon the mission's completion (Griffin, 1981, pp. 739–740). Furthermore, if a state conducts a mission which lasts longer than 60 days, it must provide information periodically at thirty-day intervals (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 78; Griffin, 1981, pp. 739–740). Consequently, as can be seen from Table 8, the only new information the Moon Treaty demands is the location of possible manned or unmanned stations (“Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,” 1979, p. 78).

Table 8: Information requirements per outer space treaty

Year	Treaty	Ratifications	Information demanded
1967	Outer Space Treaty	105	<ul style="list-style-type: none"> - The discovery of any phenomena in outer space; - The nature, conduct, locations and results of activities conducted in outer space.
1968	Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space	95	<ul style="list-style-type: none"> - If personnel of a spacecraft have suffered accidents, are experiencing conditions of distress, or have made an unintended landing; - If personnel of a spacecraft have landed on the high seas or in any other area not under the jurisdiction of any state; - If a space object or its component parts has returned to earth.
1972	Convention on International Liability for Damage Caused by Space Objects	94	
1975	Convention on Registration of Objects Launched into Outer Space	63	<ul style="list-style-type: none"> - Name of launching state; - An appropriate designator of the space object or its registration number; - Date and territory or location of launch; - Basic orbital parameters; - General function of the space object.
1979	Moon Treaty	17	<ul style="list-style-type: none"> - Time, purposes, location, duration, orbital parameters, and results of each mission to the moon; - The location and purposes of the state's manned or unmanned stations; - Any natural resources discovered on the moon.

Source: (United Nations, 2002)

The Law of the Sea Treaty

The Law of the Sea Treaty has extensive information demands, including scientific information relevant to maintain and preserve the harvested and associated species in exclusive economic zones (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 46). Moreover, in its 200th article, the treaty obliges states to “cooperate, directly or through competent international organizations, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment (“United Nations Convention on the Law of the Sea Act 1996,” 1997, p. 102). The information demands are captured in Table 9 below.

Table 9: Information requirements per high seas treaty

Year	Treaty	Ratifications	Information demanded
1958	Convention on the Territorial Sea and the Contiguous Zone	52	
1958	Convention on the High Seas	63	- After a collision, a ship must inform the other ship of the name of their ship, her port of registry and the nearest port at which she will call.
1958	Convention on Fishing and Conservation of the Living Resources of the High Seas	39	
1958	Convention on the Continental Shelf	58	
1958	Optional Protocol of Signature concerning the Compulsory Settlement of Disputes	38	
1982	Law of the Sea Treaty	168	<ul style="list-style-type: none"> - Available scientific information relevant to the conservation of fish; - Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured; - Charts and relevant information permanently describing the outer limits of a coastal state's continental shelf; - After a collision, a ship shall inform the other ship of the name of his own ship, its port of registry and the nearest port at which it will call; - Information and data acquired about pollution of the marine environment; - Flag States shall inform the requesting state and the competent international organization of the action taken and its outcome; - Information on proposed major programmes and their objectives as well as knowledge resulting from marine scientific research; - The expected starting date of marine scientific research projects; - A general description of the equipment and methods to be used in carrying out activities in the area.

Source: (“United Nations Convention on the Law of the Sea Act 1996,” 1997)

5.2.5.1 Information demand assumption: confirmed or disconfirmed?

The information requirements by the Moon Treaty do not add much value to the information requirements already in place by previous treaties. Furthermore, an explicit

demand for this information is not present, which is why I would not expect the Moon Treaty to be successful – which is the case. Regarding, the Law of the Sea Treaty, there was a high information demand, as previous agreements did not put forward any notable information requirements. Due to the lack of information requirements in the previous treaties dealing with the high seas, it is clear that the Law of the Sea Treaty improved the quality and quantity of information available regarding maritime matters. Considering the Law of the Sea Treaty was successful, the information demand assumption is highly relevant.

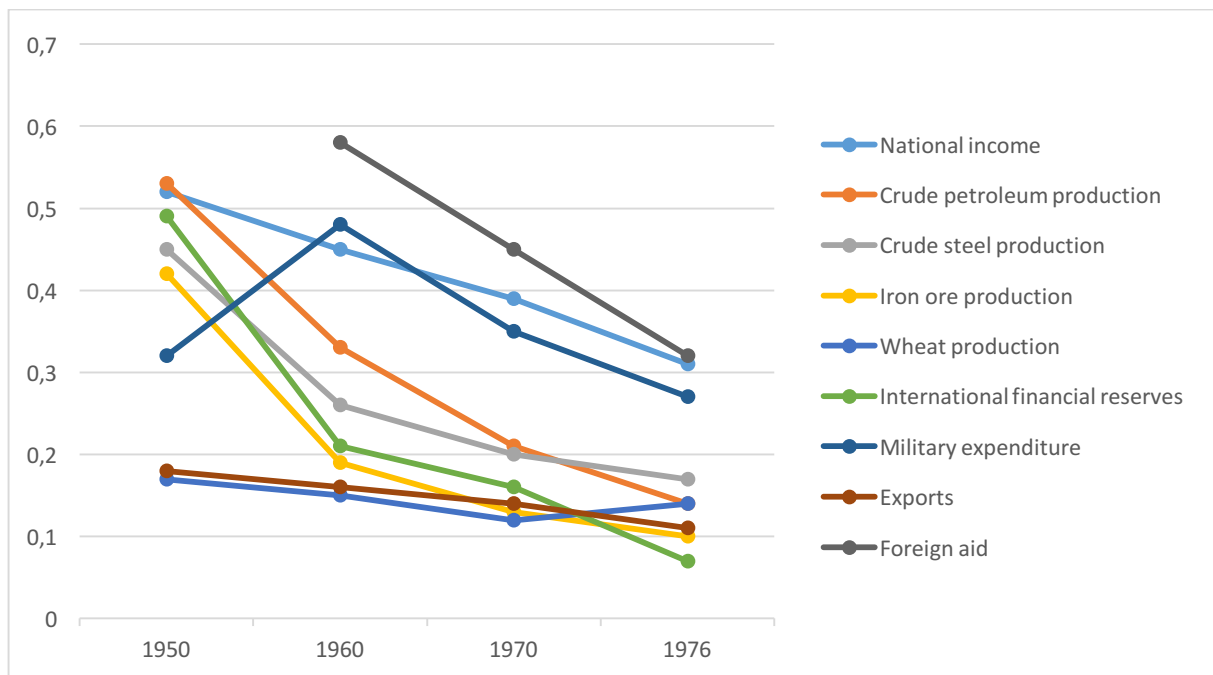
5.2.6 *Hegemonic decline*

Based on theory, my assumption is that if there is an interest, states are more likely to participate in treaties when there is no hegemon leadership, as compared to when there is hegemon leadership.

The Moon Treaty and the Law of the Sea Treaty

As mentioned earlier in the analysis, the period after 1965 saw the rise of would-be-counter-hegemonies (Cox & Sinclair, 1983, p. 60; Melchin, 2015, p. 144), which was notable with the inclusion of the common heritage of mankind principle in the Moon Treaty (Melchin, 2015, p. 147). America's global position during the 1970's and 1980's was undeniably weaker than it had been before, and the country's position as alliance leader was threatened as its share in gross national product and gross domestic products among the seven top industrialized countries shrunk from approximately 70 percent in 1950 to 43 percent in 1987 (Lepgold, 1990, pp. 13–14). Nonetheless, the impact of this decline to international institutions can be questioned, as “the U.S. effectively reordered the international system after World War II and [continued] to reap substantial benefits from the resulting arrangements” (Lepgold, 1990, p. 14). Scholar Joseph Lepgold stresses, however, the importance of *relational* power over other states, that is, the control over others' specific behaviour. According to Lepgold, the U.S. has since the 1960's increasingly had difficulties getting allies' support for its preferences in a variety of areas (Lepgold, 1990, p. 17).

Figure 2: Ratio of U.S. power capabilities to the world (in %)



Source: (Lepgold, 1990, p. 14)

As scholar Alex Elferink indicates, while the leadership role of the two superpowers – the United States and the Soviet Union – initiating the Law of the Sea Treaty, is as expected on the basis of the realist hegemonic stability theory, the theory does not readily account for the ratifications of the treaty, nor does it adequately explain the treaty’s incorporation of provisions that positively discriminate in favour of developing countries (Elferink, 2005, p. 31). Ultimately, the Law of the Sea Treaty supports the conclusion that a treaty can be finalized and enter into force without hegemon leadership; since, of the 60 ratifications required for the treaty to enter into force, all but one were by developing states (Elferink, 2005, p. 31). However, although, the developing states could bring the treaty into force by themselves, the developing states also understood that, to make the treaty’s provisions fully operative, participation of developed states was required (Elferink, 2005, p. 31). Evidently, the possibility of the Law of the Sea Treaty contributing to a disproving of the hegemonic stability theory, was superseded by events leading to the conclusion of the 1994 Agreement on the implementation of Part XI of the Law of the Sea Treaty, as the provisions increased powerful states’ influence over the International Seabed Authority and removed the obligation of private miners to transfer technology to developing states (Elferink, 2005, pp. 31–32). For this reason, the United States not being party to the treaty is regarded by many as not in the interests of the United States itself (Elferink, 2005, p. 32).

5.2.6.1 Hegemonic decline assumption: confirmed or disconfirmed?

Based on the evidence, there was a decline in American hegemony and therefore, I would assume that the Moon Treaty would be successful, especially among developing countries. Nonetheless, the outcome of the Moon Treaty suggests that this is not particularly the case. Concerning the Law of the Sea Treaty, although, the treaty proves that treaties can successfully enter into force without hegemon ratification, the 1994 Agreement shows that to achieve universal participation, concessions broadening the powers of powerful states were required. Therefore, the hegemonic decline assumption is not highly relevant.

6 Explanatory power

This chapter will reflect on the outcomes of the analysis and hereby find a concluding answer to the research question: How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty?

6.1 Explanatory power of realism

The analysis of the predictions for realism is summarized in Table 10 below:

Table 10: Outcome analysis of realism

Factor	Moon Treaty	Law of the Sea Treaty	Explanatory value
Relative gains	Present for countries without a space programme. Not present for countries with a space programme.	Present for both land-locked countries and coastal countries.	High (1)
Balance-of-power threat	Present for powerful states with space capabilities. Not present for countries without space capabilities.	Not present for both powerful states and developing states.	High (1)
Common threat	Not present for both countries with space programmes and countries without space programmes.	Present for both land-locked countries and coastal countries.	High (1)
Hegemon participation	Not present, as the U.S. did not ratify the treaty.	Not present, as the U.S. did not ratify the treaty.	Low (0)
High/low politics	Space mining concerns low politics.	Seabed exploitation concerns low politics.	Low (0)
Competition control	Not present, as the treaty does not set up clear rules and procedures for space mining	Present, as the treaty sets up clear rules and procedures for seabed mining.	High (1)
<i>Total</i>			4

All in all, realism appears to have high explanatory value when it comes to the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty, as of the six predictions, four predictions proved to have high explanatory value. Concerning relative gains, I found evidence that the Moon Treaty only improves the relative economic position of countries without a space programme, which corresponds with the ratifications of the

Moon Treaty, as only non-space powers ratified the treaty. The relative gains assumption can also explain the outcome of the Law of the Sea Treaty, since the treaty provides relative gains to both coastal nations and land-locked countries. Although, coastal states have to pay contributions to the International Seabed Authority for the exploitation of non-living resources in continental shelves, their exclusive right of exploitation in the exclusive economic zones and continental shelves, provide them with significant relative gains. Due to the success of the treaty, the relevance of this assumption is confirmed.

The balance-of-power threat assumption also turned out to be highly relevant when it comes to explaining the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty. Due to the Moon Treaty's lack of clear provisions on the establishment of the international regime governing space exploitation, major space powers did not ratify the treaty, as they feared third parties would gain too much institutional power. Unlike the Moon Treaty, the Law of the Sea Treaty's institutional framework does not pose a threat to the balance-of-power, as influential players hold key positions in all of the authority's bodies while the interests of land-locked countries and geographically disadvantaged countries are also taken into account. Taken the success of the Law of the Sea Treaty and the failure of the Moon Treaty, this assumption proved to be highly relevant.

The common threat assumption also proved to be of high relevance to the outcomes in ratifications of the Moon Treaty and the Law of the Sea Treaty. Evidence showed that the establishment of the Moon Treaty was not the result of a common threat faced by countries, as lunar exploitation was not possible at the time the treaty developed and it was argued that therefore, the scope of the treaty was too broad. On the contrary, security-related issues clearly motivated states to develop a regime for activities on the high seas. Since, the Moon Treaty was not successful whereas the Law of the Sea Treaty was, the outcomes of the ratifications can be explained by the common threat assumption. The hegemon participation assumption, however, proved not to be of high relevance. Although, the United States' refusal to ratify the Moon Treaty could explain the low amount of ratifications, the same does not apply for the Law of the Sea Treaty, which was also not ratified by the United States, yet turned out to be successful.

The assumption regarding high/low politics did not prove to be of high relevance, as the Moon Treaty – a treaty concerning issues of low politics – was not successful, whereas the Law of the Sea Treaty – also a treaty concerning issues of low politics – was successful. However, the evidence did support the competition control assumption, as the Moon Treaty did not adequately establish a regime with clear rules and procedures for lunar

exploitation, whereas the Law of the Sea Treaty did provide such a framework for the seabed.

6.2 Explanatory power of liberal institutionalism

The analysis of the predictions for realism is summarized in Table 11 below:

Table 11: Outcome analysis of liberal institutionalism

Factor	Moon Treaty	Law of the Sea Treaty	Explanatory Value
Absolute gains	Present for countries without a space programme. Not present for countries with a space programme.	Present for coastal nations and land-locked countries.	High (1)
Transaction costs	High transaction costs are present.	Low transaction costs are present.	High (1)
Institutional participation	High institutional participation, as previous treaties were more successful.	Low institutional participation, as previous treaties were less successful.	Low (0)
Legal framework demand	Not present, as space mining was not yet feasible.	Present, as seabed mining was feasible.	High (1)
Information demand	Not present, information established in previous treaties is adequate.	Present, information established in previous treaties is not adequate.	High (1)
Hegemonic decline	Present, as American hegemony was declining.	Present, as American hegemony was declining.	Low (0)
<i>Total</i>			4

All in all, the analysis showed that liberal institutionalism also provides high explanatory leverage for the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty, as also four of the six predictions proved to be of high relevance. The absolute gains assumption proved to be of high value, since the assumption could explain the positive outcome of the Law of the Sea Treaty, as well as the negative outcome of to the Moon Treaty. Likewise, the assumption related to transaction costs had high explanatory power regarding the differences in ratifications. Evidence showed that the Moon Treaty involves high transaction costs, and the benefits derived from the treaty do not outweigh these costs, whereas the Law of the Sea Treaty has high value and reduces transaction costs, hereby confirming the relevance of the transaction costs assumption.

The assumption on institutional participation did not explain the differences in ratifications, since countries successfully participated in treaties concerning outer space, yet,

this did not guarantee the success of the Moon Treaty. Notably, however, the vast majority of countries that did ratify the Moon Treaty, also ratified all other United Nations treaties relating to space. Nonetheless, the Law of the Sea Treaty was successful, despite previous treaties concerning the seabed did not receive such a high turnout of ratifications. Therefore, institutional participation did not seem to make states significantly more cooperative in the treaties.

The legal framework demand assumption did prove to be of high relevance, as a demand for a treaty regulating lunar exploitation was not present, whereas a significant demand for a treaty regulating ocean affairs was present. Likewise, the evidence supported the information demand assumption. The Moon Treaty did not provide demanded high-quality information, whereas the Law of the Sea Treaty did. Namely, prior to the Law of the Sea Treaty, there was very little exchange of information on ocean affairs, a situation significantly improved by the treaty.

Lastly, hegemonic decline was not able to explain the differences in ratifications of the Moon Treaty and the Law of the Sea Treaty. Despite the fact that American hegemony was declining and the U.S. did not participate in either of the treaties, the Moon Treaty was not successful, whereas the Law of the Sea Treaty was. Consequently, the hegemonic decline assumption proved not to be highly relevant.

7 Conclusion

The concluding chapter will provide a short summary of the findings and include the encountered limitations of the research as well as suggestions for further research in this area.

7.1 Summary of findings

This thesis aimed to answer the question: How can international relations theory explain differences in ratifications of the Moon Treaty and the Law of the Sea Treaty? The research question aims to explain why the Moon Treaty had few ratifications, whereas the Law of the Sea Treaty was ratified by almost all countries in the world. In the first part of my analysis, I looked at the explanatory leverage of realism, by finding evidence for six factors that I assume influence the level of cooperation of states in treaties: relative gains, balance-of-power threat, common threat, hegemon participation, high/low politics, and competition control. For realism, I was able to find compelling evidence for the differences in ratifications. Particularly, the factors relative gains, balance-of-power threat, common threat, and competition control proved to be of high relevance.

In the second part of my analysis, I looked at the explanatory leverage of liberal institutionalism, by finding evidence for six factors that I assume influence the level of cooperation of states in treaties: absolute gains, transaction costs, institutional participation, legal framework demand, information demand, and hegemonic decline. For liberal institutionalism, I was also able to find compelling evidence for the differences in ratification, to an equal extent as realism. Particularly, the factors absolute gains, transaction costs, legal framework demand, and information demand seemed to play a huge role in the analysis, hereby confirming Ronald Coase's perception of the emergence of international institutions.

It is evident from my research that both realist and liberal institutionalist concepts matter to states' willingness to cooperate in global commons. From my analysis and the outcomes of the treaties can be concluded that states care about issues that matter to their political power, as well as to their economic well-being, and for that reason states do not readily participate in treaties that pose threats to these factors. Furthermore, the analysis

shows that for countries to participate in treaties, a security threat has to be present, or at the very least, the treaty has to address a relevant problem. At the time of ratification, there was no pressing global demand for a specific regime for lunar exploitation, whereas, in the case of the Law of the Sea Treaty, a global demand for a regime governing ocean activities was strongly present. Lastly, the analysis shows that countries favour framework treaties with clear rules and guidelines and that reduce transaction costs. The vagueness of the Moon Treaty's provisions regarding the international regime that would govern lunar exploitation posed concerns to space-faring powers, as they feared that such vagueness would allow developing countries to impose a multitude of rules at the expense of powerful states. The Law of the Sea Treaty, however, is very elaborate and specific and therefore, reduces legal uncertainty.

7.2 Limitations

7.2.1 *Trustworthiness and accuracy*

While the terms reliability and validity are essential criteria for quality in quantitative research, in qualitative research, these criteria are conceptualized as trustworthiness and accuracy (Golafshani, 2003, p. 604). To achieve quality of research, a researcher must eliminate bias and increase truthfulness, which can be achieved through triangulation – “a validity procedure where researchers search for convergence among multiple and different sources of information” (Golafshani, 2003, p. 604). To ensure the accuracy of my research, I chose to use a wide variety of sources; however, the research does have one major limitation: subjectivity. Since, a congruence analysis depends upon the researcher's own assumptions, a possibility exists that the assumptions are not correct. Nonetheless, the assumptions are based on theory from literature, which are discussed in the theoretical framework. Furthermore, by selecting six predictions for each theory, the possibility of false outcomes is minimized. Lastly, the assumptions have been discussed with and supervised by a supervisor, hereby reducing the chance of faulty inferences.

7.2.2 *Historical developments of maritime law and space law*

Another limitation suffices as regards to shortcomings of the theoretical framework due to its disregard of differences in developments of maritime law and space law. A major part of the modern law of the sea is built upon practices and concepts that date back to the 17th century (Bollmann et al., 2010, p. 198; Potter, 1902, p. 150). In 1609, the Dutch jurist Hugo Grotius formulated the “freedom of the seas” principle and claimed that the sea is

international territory and all nations are free to use it (Bollmann et al., 2010, p. 199). In subsequent years, the right of coastal states to appropriate straits, bays and gulfs enclosed by their land was acknowledged by Grotius, however, he argued that innocent passage cannot be forbidden in these areas. Since the 17th century, countries generally accepted coastal countries' rights to a territorial sea of three nautical miles (Bollmann et al., 2010, p. 198). Ultimately, the recent Law of the Sea Treaty can be seen as a major harmonization and generalization of longstanding political and legal norms. However, this is not the case for spatial law, in which the discussions on rights and property do not lie behind us but in front of us.

The discrepancy between the stages of development of maritime property and space mining is also important in regard to the common heritage of mankind principle. The common heritage of mankind principle was originally designed for the deep seabed and not space law (Melchin, 2015, p. 147) and thus, one might argue that this fact might explain why the principle was accepted under the Law of the Sea Treaty and not the Moon Treaty. However, some scholars argue that the widespread ratification of the Outer Space Treaty suggests state acceptance of the common heritage of mankind principle in space law (Melchin, 2015, p. 155). Nonetheless, it should also be noted that since deep seabed mining has not proved to be cost-effective, the common heritage of mankind principle as applied to the high seas in the Law of the Sea Treaty has limited value (Bollmann et al., 2010, p. 205). Furthermore, the 1994 Agreement Relating to the Implementation of Part XI of the Law of the Sea Treaty significantly moderated the impact of the common heritage of mankind principle in relation to the seabed (Siavash, 2017, p. 109).

7.2.3 *International relations theory and international law*

Another issue with the common heritage of mankind principle regards the nature of the concept: is it derived from morality or politics, or from sources of international law (Baslar, 1998, p. 8)? Positivist legal lawyers seek the validity of the common heritage of mankind, as an international legal concept in treaties, whereas some scholars assert the view that the principle marks the end of traditional positivist international law and is merely philosophical (Baslar, 1998, p. 8). Ultimately, the common heritage of mankind principle is based on natural law and in its modern context is refined by normative orders created by positive legal frameworks that draw on distinctive normative principles (Sutch, 2017).

More broadly is the limitation regarding the extent to which international relations theory and the subject of my thesis are compatible. Treaties are cooperative practices in

international relations (Keohane, 1997, p. 488), however, the Moon Treaty and the Law of the Sea Treaty are largely normative frameworks for the legal governance of outer space and international waters and entail normative legal constructs (i.e. what the world ought to be), whereas international relations theory is positivist and discusses the world as it actually is (Bollmann et al., 2010, p. 205; Craciunescu, 2013, p. 31; Manners, 2002, p. 240). Nonetheless, it is useful to apply international relations theory to the subject of international law.

As scholar John Setear rightly indicates, “international legal scholarship remains in serene isolation even from internationally oriented theories of political science, despite the fact that the international legal system, lacking a centralized enforcement body with reliable coercive authority, must depend upon politics for its efficacy far more than does any body of domestic legal rules” (Setear, 1996). Since states are sovereign, they are not subject to a juridical authority that is superior to them and thus, the international community is only governed by the laws and institutions which they agreed to (Hillier, 1998, p. 27). Ultimately, international law governs relations between states and is a law for states (Hillier, 1998, p. 10) and it cannot be isolated from the political factors operating in the sphere of international relations (Hillier, 1998, p. 7). Therefore, scholar Tim Hillier argues that “international law should be studied in the context of international society and not merely as a collection of legal rules capable of being understood on their own” (Hillier, 1998, p. 12). Moreover, Setear even argues that the application of international relations theory to international law has more evaluative and predictive power than the law of treaties (Setear, 1996).

7.3 Concluding remarks and recommendations for further research

Regulating global commons is not an easy task due to the issues of sovereignty, territoriality, exploitation and differing interests of developed and developing nations (Schrijver, 2016, pp. 1259–1261) – yet not impossible as the Law of the Sea Treaty illustrates. A significant weakness in the governance of global commons is the treatment of global commons regimes as separate rather than as global commons law more generally (Sutch, 2017). With the growing demand for a legal framework for space exploitation, it is crucial to take the findings of this research into account in the development of a new regime for space or

future amendments to the Moon Treaty. All in all, two important points must be taken into account.

First, property rights must be granted to some extent, will the Moon Treaty ever be of much success (Cherian & Abraham, 2007, p. 211; Siavash, 2017, p. 108), or any treaty relating to space mining for that manner. Considering the recent efforts of private enterprises in the space arena, it is particularly important to consider their interests (Siavash, 2017, p. 109). Second, the interests of developing states cannot be ignored, and thus, some balancing approach will have to be achieved, which proves to be a challenging endeavour. A key step to achieve this end is the formulation of clear explanations of elements of the common heritage of mankind.

All in all, I agree with other scholars in the field that the Law of the Sea Treaty constitutes a useful framework that could and should be used for outer space. In fact, ratifying an additional agreement similar to the 1994 Agreement in the case of the Moon Treaty could be a great way to combine the concepts of common property with limited ownership in regard to outer space (Siavash, 2017, p. 109). Further research should be conducted as to the feasibility of implementing such a regime to space, taken that the application of private property rights in space is a complex issue. Luckily, scholars like Ricky Lee have written elaborate proposals for such a regime (Lee, 2012), leaving it up to the international community to take the next step.

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Appendix I: Outer Space Treaty

A. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies

Article 1

The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.

Article 2

Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

Article 3

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

Article 4

States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies shall also not be prohibited.

Article 5

States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle.

In carrying on activities in outer space and on celestial bodies, the astronauts of one State Party shall render all possible assistance to the astronauts of other States Parties.

States Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts.

Article 6

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.

Article 7

Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.

Article 8

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.

Article 9

In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extra-terrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.

If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment.

Article 10

In order to promote international cooperation in the exploration and use of outer space, including the Moon and other celestial bodies, in conformity with the purposes of this Treaty, the States Parties to the Treaty shall consider on a basis of equality any requests by other States Parties to the Treaty to be afforded an opportunity to observe the flight of space objects launched by those States.

The nature of such an opportunity for observation and the conditions under which it could be afforded shall be determined by agreement between the States concerned.

Article 11

In order to promote international cooperation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the Moon and other celestial bodies, agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities. On receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.

Article 12

All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

Article 13

The provisions of this Treaty shall apply to the activities of States Parties to the Treaty in the exploration and use of outer space, including the Moon and other celestial bodies, whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international intergovernmental organizations.

Any practical questions arising in connection with activities carried on by international intergovernmental organizations in the exploration and use of outer space, including the Moon and other celestial bodies, shall be resolved by the States Parties to the Treaty either with the

appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty.

Article 14

This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America, which are hereby designated the Depositary Governments.

This Treaty shall enter into force upon the deposit of instruments of ratification by five Governments including the Governments designated as Depositary Governments under this Treaty.

For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Treaty, the date of its entry into force and other notices.

This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article 15

Any State Party to the Treaty may propose amendments to this Treaty. Amendments shall enter into force for each State Party to the Treaty accepting the amendments upon their acceptance by a majority of the States Parties to the Treaty and thereafter for each remaining State Party to the Treaty on the date of acceptance by it.

Article 16

Any State Party to the Treaty may give notice of its withdrawal from the Treaty one year after its entry into force by written notification to the Depositary Governments. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article 17

This Treaty, of which the Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

Source: (United Nations Office for Disarmament Affairs, 2017)

Appendix II: The Moon Treaty

E. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

Article 1

The provisions of this Agreement relating to the Moon shall also apply to other celestial bodies within the solar system, other than the Earth, except insofar as specific legal norms enter into force with respect to any of these celestial bodies.

For the purposes of this Agreement reference to the Moon shall include orbits around or other trajectories to or around it.

This Agreement does not apply to extra-terrestrial materials which reach the surface of the Earth by natural means.

Article 2

All activities on the Moon, including its exploration and use, shall be carried out in accordance with international law, in particular the Charter of the United Nations, and taking into account the Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, adopted by the General Assembly on 24 October 1970, in the interest of maintaining peace and security and promoting international cooperation and mutual understanding, and with due regard to the corresponding interests of all other States Parties.

Article 3

The Moon shall be used by all States Parties exclusively for peaceful purposes.

Any threat or use of force or any other hostile act or threat of hostile act on the Moon is prohibited. It is likewise prohibited to use the Moon in order to commit any such act or to engage in any such threat in relation to the Earth, the Moon, spacecraft, the personnel of spacecraft or manmade space objects.

States Parties shall not place in orbit around or other trajectory to or around the Moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the Moon.

The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the Moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the Moon shall also not be prohibited.

Article 4

The exploration and use of the Moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.

States Parties shall be guided by the principle of cooperation and mutual assistance in all their activities concerning the exploration and use of the Moon. International cooperation in pursuance of this Agreement should be as wide as possible and may take place on a multilateral basis, on a bilateral basis or through international intergovernmental organizations.

Article 5

States Parties shall inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of their activities concerned with the exploration and use of the Moon. Information on the time, purposes, locations, orbital parameters and duration shall be given in respect of each mission to the Moon as soon as possible after launching, while information on the results of each mission, including scientific results, shall be furnished upon completion of the mission. In the case of a mission lasting more than sixty days, information on conduct of the mission, including any scientific results, shall be given periodically, at thirty-day intervals. For missions lasting more than six months, only significant additions to such information need be reported thereafter.

If a State Party becomes aware that another State Party plans to operate simultaneously in the same area of or in the same orbit around or trajectory to or around the Moon, it shall promptly inform the other State of the timing of and plans for its own operations.

In carrying out activities under this Agreement, States Parties shall promptly inform the Secretary-General, as well as the public and the international scientific community, of any phenomena they discover in outer space, including the Moon, which could endanger human life or health, as well as of any indication of organic life.

Article 6

There shall be freedom of scientific investigation on the Moon by all States Parties without discrimination of any kind, on the basis of equality and in accordance with international law.

In carrying out scientific investigations and in furtherance of the provisions of this Agreement, the States Parties shall have the right to collect on and remove from the Moon samples of its mineral and other substances. Such samples shall remain at the disposal of those States Parties which caused them to be collected and may be used by them for scientific purposes. States Parties shall have regard to the desirability of making a portion of such samples available to other interested States Parties and the international scientific community for scientific investigation. States Parties may in the course of scientific investigations also use mineral and other substances of the Moon in quantities appropriate for the support of their missions.

States Parties agree on the desirability of exchanging scientific and other personnel on expeditions to or installations on the Moon to the greatest extent feasible and practicable.

Article 7

In exploring and using the Moon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise. States Parties shall also take measures to avoid harmfully affecting the environment of the Earth through the introduction of extra-terrestrial matter or otherwise.

States Parties shall inform the Secretary-General of the United Nations of the measures being adopted by them in accordance with paragraph 1 of this article and shall also, to the maximum extent feasible, notify him in advance of all placements by them of radioactive materials on the Moon and of the purposes of such placements.

States Parties shall report to other States Parties and to the Secretary-General concerning areas of the Moon having special scientific interest in order that, without prejudice to the rights of other States Parties, consideration may be given to the designation of such areas as international scientific preserves for which special protective arrangements are to be agreed upon in consultation with the competent bodies of the United Nations.

Article 8

States Parties may pursue their activities in the exploration and use of the Moon anywhere on or below its surface, subject to the provisions of this Agreement.

For these purposes States Parties may, in particular:

Land their space objects on the Moon and launch them from the Moon;

Place their personnel, space vehicles, equipment, facilities, stations and installations anywhere on or below the surface of the Moon. Personnel, space vehicles, equipment, facilities, stations and installations may move or be moved freely over or below the surface of the Moon.

Activities of States Parties in accordance with paragraphs 1 and 2 of this article shall not interfere with the activities of other States Parties on the Moon. Where such interference may occur, the States Parties concerned shall undertake consultations in accordance with article 15, paragraphs 2 and 3, of this Agreement.

Article 9

States Parties may establish manned and unmanned stations on the Moon. A State Party establishing a station shall use only that area which is required for the needs of the station and shall immediately inform the Secretary-General of the United Nations of the location and purposes of that station. Subsequently, at annual intervals that State shall likewise inform the Secretary-General whether the station continues in use and whether its purposes have changed.

Stations shall be installed in such a manner that they do not impede the free access to all areas of the Moon of personnel, vehicles and equipment of other States Parties conducting activities on the Moon in accordance with the provisions of this Agreement or of article I of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article 10

States Parties shall adopt all practicable measures to safeguard the life and health of persons on the Moon. For this purpose, they shall regard any person on the Moon as an astronaut within the meaning of article V of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and as part of the personnel of a spacecraft within the meaning of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.

States Parties shall offer shelter in their stations, installations, vehicles and other facilities to persons in distress on the Moon.

Article 11

The Moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article.

The Moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.

States Parties have the right to exploration and use of the Moon without discrimination of any kind, on the basis of equality and in accordance with international law and the terms of this Agreement.

States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible. This provision shall be implemented in accordance with article 18 of this Agreement.

In order to facilitate the establishment of the international regime referred to in paragraph 5 of this article, States Parties shall inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of any natural resources they may discover on the Moon.

The main purposes of the international regime to be established shall include:

The orderly and safe development of the natural resources of the Moon;

The rational management of those resources;

The expansion of opportunities in the use of those resources;

An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon, shall be given special consideration.

All the activities with respect to the natural resources of the Moon shall be carried out in a manner compatible with the purposes specified in paragraph 7 of this article and the provisions of article 6, paragraph 2, of this Agreement.

Article 12

States Parties shall retain jurisdiction and control over their personnel, vehicles, equipment, facilities, stations and installations on the Moon. The ownership of space vehicles, equipment, facilities, stations and installations shall not be affected by their presence on the Moon.

Vehicles, installations and equipment or their component parts found in places other than their intended location shall be dealt with in accordance with article 5 of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.

In the event of an emergency involving a threat to human life, States Parties may use the equipment, vehicles, installations, facilities or supplies of other States Parties on the Moon. Prompt notification of such use shall be made to the Secretary-General of the United Nations or the State Party concerned.

Article 13

A State Party which learns of the crash landing, forced landing or other unintended landing on the Moon of a space object, or its component parts, that were not launched by it, shall promptly inform the launching State Party and the Secretary-General of the United Nations.

Article 14

States Parties to this Agreement shall bear international responsibility for national activities on the Moon, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in this Agreement. States Parties shall ensure that non-governmental entities under their jurisdiction shall engage in activities on the Moon only under the authority and continuing supervision of the appropriate State Party.

States Parties recognize that detailed arrangements concerning liability for damage caused on the Moon, in addition to the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and the Convention on International Liability for Damage Caused by Space Objects, may become necessary as a result of more extensive activities on the Moon. Any such arrangements shall be elaborated in accordance with the procedure provided for in article 18 of this Agreement.

Article 15

Each State Party may assure itself that the activities of other States Parties in the exploration and use of the Moon are compatible with the provisions of this Agreement. To this end, all space vehicles, equipment, facilities, stations and installations on the Moon shall be open to other States Parties. Such States Parties shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited. In pursuance of this article, any State Party may act on its own behalf or with the full or partial assistance of any other State Party or through appropriate international procedures within the framework of the United Nations and in accordance with the Charter.

A State Party which has reason to believe that another State Party is not fulfilling the obligations incumbent upon it pursuant to this Agreement or that another State Party is interfering with the rights which the former State has under this Agreement may request consultations with that State Party. A State Party receiving such a request shall enter into such consultations without delay. Any

other State Party which requests to do so shall be entitled to take part in the consultations. Each State Party participating in such consultations shall seek a mutually acceptable resolution of any controversy and shall bear in mind the rights and interests of all States Parties. The Secretary-General of the United Nations shall be informed of the results of the consultations and shall transmit the information received to all States Parties concerned.

If the consultations do not lead to a mutually acceptable settlement which has due regard for the rights and interests of all States Parties, the parties concerned shall take all measures to settle the dispute by other peaceful means of their choice appropriate to the circumstances and the nature of the dispute. If difficulties arise in connection with the opening of consultations or if consultations do not lead to a mutually acceptable settlement, any State Party may seek the assistance of the Secretary-General, without seeking the consent of any other State Party concerned, in order to resolve the controversy. A State Party which does not maintain diplomatic relations with another State Party concerned shall participate in such consultations, at its choice, either itself or through another State Party or the Secretary-General as intermediary.

Article 16

With the exception of articles 17 to 21, references in this Agreement to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Agreement and if a majority of the States members of the organization are States Parties to this Agreement and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. States members of any such organization which are States Parties to this Agreement shall take all appropriate steps to ensure that the organization makes a declaration in accordance with the foregoing.

Article 17

Any State Party to this Agreement may propose amendments to the Agreement. Amendments shall enter into force for each State Party to the Agreement accepting the amendments upon their acceptance by a majority of the States Parties to the Agreement and thereafter for each remaining State Party to the Agreement on the date of acceptance by it.

Article 18

Ten years after the entry into force of this Agreement, the question of the review of the Agreement shall be included in the provisional agenda of the General Assembly of the United Nations in order to consider, in the light of past application of the Agreement, whether it requires revision. However, at any time after the Agreement has been in force for five years, the Secretary-General of the United Nations, as depositary, shall, at the request of one third of the States Parties to the Agreement and with the concurrence of the majority of the States Parties, convene a conference of the States Parties to review this Agreement. A review conference shall also consider the question of the implementation of the provisions of article 11, paragraph 5, on the basis of the principle referred to in paragraph 1 of that article and taking into account in particular any relevant technological developments.

Article 19

This Agreement shall be open for signature by all States at United Nations Headquarters in New York.

This Agreement shall be subject to ratification by signatory States. Any State which does not sign this Agreement before its entry into force in accordance with paragraph 3 of this article may accede to it at any time. Instruments of ratification or accession shall be deposited with the Secretary-General of the United Nations.

This Agreement shall enter into force on the thirtieth day following the date of deposit of the fifth instrument of ratification.

For each State depositing its instrument of ratification or accession after the entry into force of this Agreement, it shall enter into force on the thirtieth day following the date of deposit of any such instrument.

The Secretary-General shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or accession to this Agreement, the date of its entry into force and other notices.

Article 20

Any State Party to this Agreement may give notice of its withdrawal from the Agreement one year after its entry into force by written notification to the Secretary-General of the United Nations. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article 21

The original of this Agreement, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to all signatory and acceding States.

Source: (United Nations, 2017)

Appendix III: The Moon Treaty and the Law of the Sea Treaty ratifications

Participating countries	Law of the Sea Treaty	Moon Treaty	Coastal state
Albania	Yes	No	Yes
Algeria	Yes	No	Yes
Angola	Yes	No	Yes
Antigua and Barbuda	Yes	No	Yes
Argentina	Yes	No	Yes
Armenia	Yes	No	No
Australia	Yes	Yes	No
Austria	No	Yes	No
Azerbaijan	Yes	No	Yes
Bahamas	Yes	No	Yes
Bahrain	Yes	No	Yes
Bangladesh	Yes	No	Yes
Barbados	Yes	No	Yes
Belarus	Yes	No	No
Belgium	Yes	Yes	Yes
Belize	Yes	No	Yes
Benin	Yes	No	Yes
Bolivia	Yes	No	No
Bosnia and Herzegovina	Yes	No	Yes
Botswana	Yes	No	No
Brazil	Yes	No	Yes
Brunei Darussalam	Yes	No	Yes
Bulgaria	Yes	No	Yes
Burkina Faso	Yes	No	No
Cabo Verde	Yes	No	Yes
Cameroon	Yes	No	Yes
Canada	Yes	No	Yes
Chad	Yes	No	No
Chile	Yes	Yes	Yes
China	Yes	No	Yes
Comoros	Yes	No	Yes
Congo	Yes	No	Yes
Cook Islands	Yes	No	Yes
Costa Rica	Yes	No	Yes
Côte d'Ivoire	Yes	No	Yes
Croatia	Yes	No	Yes
Cuba	Yes	No	Yes
Cyprus	Yes	No	Yes
Czech Republic	Yes	No	No
Democratic Republic of the Congo	Yes	No	Yes
Denmark	Yes	No	Yes
Djibouti	Yes	No	Yes
Dominica	Yes	No	Yes
Dominican Republic	Yes	No	Yes
Ecuador	Yes	No	Yes
Egypt	Yes	No	Yes

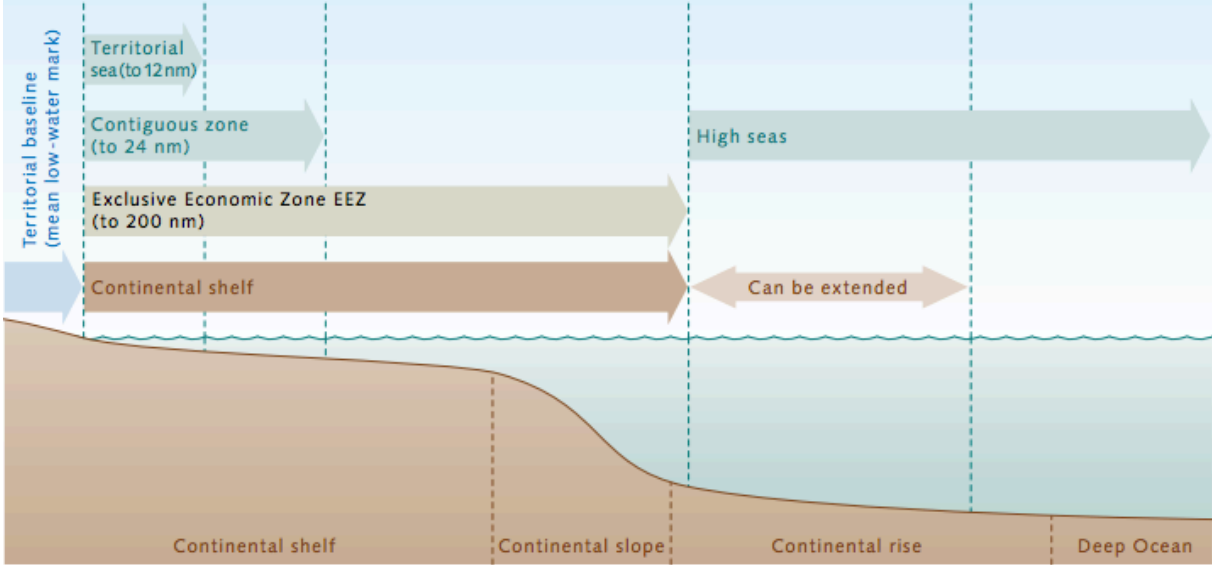
Equatorial Guinea	Yes	No	Yes
Estonia	Yes	No	Yes
European Union	Yes	No	Yes
Fiji	Yes	No	Yes
Finland	Yes	No	Yes
France	Yes	No	Yes
Gabon	Yes	No	Yes
Gambia	Yes	No	Yes
Georgia	Yes	No	Yes
Germany	Yes	No	Yes
Ghana	Yes	No	Yes
Greece	Yes	No	Yes
Grenada	Yes	No	Yes
Guatemala	Yes	No	Yes
Guinea	Yes	No	Yes
Guinea-Bissau	Yes	No	Yes
Guyana	Yes	No	Yes
Haiti	Yes	No	Yes
Honduras	Yes	No	Yes
Hungary	Yes	No	No
Iceland	Yes	No	Yes
India	Yes	No	Yes
Indonesia	Yes	No	Yes
Iraq	Yes	No	Yes
Ireland	Yes	No	Yes
Italy	Yes	No	Yes
Jamaica	Yes	No	Yes
Japan	Yes	No	Yes
Jordan	Yes	No	Yes
Kazakhstan	No	Yes	No
Kenya	Yes	No	Yes
Kiribati	Yes	No	Yes
Kuwait	Yes	Yes	Yes
Lao's People's Democratic Republic	Yes	No	No
Latvia	Yes	No	Yes
Lebanon	Yes	Yes	Yes
Lesotho	Yes	No	No
Liberia	Yes	No	Yes
Lithuania	Yes	No	Yes
Luxembourg	Yes	No	No
Madagascar	Yes	No	Yes
Malawi	Yes	No	No
Malaysia	Yes	No	Yes
Maldives	Yes	No	Yes
Mali	Yes	No	No
Malta	Yes	No	Yes
Marshall Islands	Yes	No	Yes
Mauritania	Yes	No	Yes

Mauritius	Yes	No	Yes
Mexico	Yes	Yes	Yes
Micronesia	Yes	No	Yes
Monaco	Yes	No	Yes
Mongolia	Yes	No	No
Montenegro	Yes	No	Yes
Morocco	Yes	Yes	Yes
Mozambique	Yes	No	Yes
Myanmar	Yes	No	Yes
Namibia	Yes	No	Yes
Nauru	Yes	No	Yes
Nepal	Yes	No	No
Netherlands	Yes	Yes	Yes
New Zealand	Yes	No	Yes
Nicaragua	Yes	No	Yes
Niger	Yes	No	No
Nigeria	Yes	No	Yes
Niue	Yes	No	Yes
Norway	Yes	No	Yes
Oman	Yes	No	Yes
Pakistan	Yes	Yes	Yes
Palau	Yes	No	Yes
Panama	Yes	No	Yes
Papua New Guinea	Yes	No	Yes
Paraguay	Yes	No	No
Peru	No	Yes	Yes
Philippines	Yes	Yes	Yes
Poland	Yes	No	Yes
Portugal	Yes	No	Yes
Qatar	Yes	No	Yes
Republic of Korea	Yes	No	Yes
Republic of Moldova	Yes	No	Yes
Romania	Yes	No	Yes
Russian Federation	Yes	No	Yes
Samoa	Yes	No	Yes
Sao Tome and Principe	Yes	No	Yes
Saudi Arabia	Yes	Yes	Yes
Senegal	Yes	No	Yes
Serbia	Yes	No	No
Seychelles	Yes	No	Yes
Sierra Leone	Yes	No	Yes
Singapore	Yes	No	Yes
Slovakia	Yes	No	No
Slovenia	Yes	No	Yes
Solomon Islands	Yes	No	Yes
Somalia	Yes	No	Yes
South Africa	Yes	No	Yes
Spain	Yes	No	Yes
Sri Lanka	Yes	No	Yes

St. Kitts and Nevis	Yes	No	Yes
St. Lucia	Yes	No	Yes
St. Vincent and the Grenadines	Yes	No	Yes
State of Palestine	Yes	No	Yes
Sudan	Yes	No	Yes
Suriname	Yes	No	Yes
Swaziland	Yes	No	No
Sweden	Yes	No	Yes
Switzerland	Yes	No	No
Thailand	Yes	No	Yes
The former Yugoslav Republic of Macedonia	Yes	No	Yes
Timor-Leste	Yes	No	Yes
Togo	Yes	No	Yes
Tonga	Yes	No	Yes
Trinidad and Tobago	Yes	No	Yes
Tunisia	Yes	No	Yes
Turkey	No	Yes	Yes
Tuvalu	Yes	No	Yes
Uganda	Yes	No	No
Ukraine	Yes	No	Yes
United Kingdom of Great Britain and Northern Ireland	Yes	No	Yes
United Republic of Tanzania	Yes	No	Yes
Uruguay	Yes	Yes	Yes
Vanuatu	Yes	No	Yes
Venezuela	No	Yes	
Viet Nam	Yes	No	Yes
Yemen	Yes	No	Yes
Zambia	Yes	No	No
Zimbabwe	Yes	No	No

Source: ("Multilateral Treaties Deposited with the Secretary-General," 2017a, United Nations Convention On The Law Of The Sea, 2016)

Appendix IV: Maritime zones according to the Law of the Sea Treaty



Source: (Bollmann et al., 2010, p. 200)