Interests, Institutions, and the Environment: An Examination of Fisheries Subsidies

Stephanie J. Rickard

Department of Government, London School of Economics and Political Science, UK

Protecting the environment has emerged as one of the major challenges in international relations. In international environmental negotiations, countries hold divergent positions because of domestic politics and specifically the interaction of interests and institutions. Domestic political institutions privilege the interests of some groups over others, depending on their geographic distribution. This observation matters for global environmental cooperation because groups with varied interests in protecting the environment often exhibit different geographic patterns, as illustrated in negotiations over fisheries subsidies at the World Trade Organization (WTO). The fishing industry tends to be concentrated in geographic space because of its reliance on a geographically specific natural resource. The industry's geographic concentration gives it relatively more political clout in countries with plurality electoral systems. Environmentalists, who tend to be more diffuse geographically, enjoy greater political influence in countries with proportional representation systems and party-centered electoral competition. These political dynamics, as well as the electoral success of Green political parties, influence governments' spending priorities as well as states' positions in international environmental negotiations.

La protección del medioambiente se ha convertido en uno de los principales desafíos en las relaciones internacionales. En las negociaciones internacionales sobre el medioambiente, los países mantienen posiciones divergentes debido a la política interna y, concretamente, a la interacción de intereses e instituciones. Las instituciones políticas nacionales privilegian los intereses de ciertos grupos sobre otros según la distribución geográfica. Esta observación es importante para la cooperación ambiental mundial porque los grupos con intereses variados en la protección del medioambiente a menudo presentan patrones geográficos diferentes, como se ha visto en las negociaciones sobre las subvenciones a la pesca en la Organización Mundial del Comercio (OMC). La industria pesquera tiende a concentrarse en el espacio geográfico debido a su dependencia de un recurso natural geográficamente específico. La concentración geográfica de la industria le da un peso político relativamente mayor en los países con sistemas electorales pluralistas. Los ecologistas, que suelen estar más repartidos geográficamente, tienen mayor influencia política en los países con sistemas de representación proporcional y competencia electoral centrada en los partidos. Esta dinámica política, así como el éxito electoral de los partidos políticos ecologistas, influyen en las prioridades de gasto de los gobiernos, así como en la posición de los Estados en las negociaciones internacionales sobre el medioambiente.

La protection de l'environnement est apparue comme étant l'un des défis majeures en relations internationales. Dans les négociations internationales sur l'environnement, les pays tiennent des positions divergentes en raison de leur politique nationale et plus particuliérement de l'interaction des intérêts et des institutions. Les institutions politiques nationales privilégient les intérêts de certains groupes par rapport á d'autres en fonction de leur répartition géographique. Cette observation a son importance pour la coopération mondiale en matiére d'environnement, car des groupes ayant des intérêts variés dans la protection de l'environnement présentent souvent des profils géographiques différentes, comme l'illustrent les négociations sur les subventions á la pêche dans l'Organisation mondiale du commerce (OMC). Le secteur de la pêche tend á être concentré dans un espace géographique de par sa dépendance á une ressource naturelle géographiquement spécifique. La concentration géographique de ce secteur lui confére un poids politique relativement plus important dans les pays dotés de systémes électoraux pluralistes. Les écologistes, qui tendent á être plus dispersés géographiquement, jouissent d'une plus grande influence politique dans les pays dotés de systémes de représentation proportionnelle et oú la compétition électorale est centrée sur les partis. Ces dynamiques politiques, ainsi que le succés électoral des partis politiques écologistes, influencent les priorités de dépenses des gouvernements ainsi que les positions des États lors des négociations internationales sur l'environnement.

Protecting the environment is a global challenge. Worldwide, coordinated action is needed to address many of today's pressing environmental issues. However, international consensus on how to protect the world's natural resources remains elusive. Despite 20 years of negotiations at the World Trade Organization (WTO), countries have failed to agree on restrictions limiting government subsidies that contribute to the destruction of the ocean's biomass. This deadlock, like many of the standoffs over international environmental cooperation, is rooted squarely in domestic politics and specifically the interaction of interests and institutions. Domestic political institutions privilege the interests of some groups over others, depending on their geographic distribution, and groups with varied interests in protecting the environment often exhibit different geographic patterns. These political dynamics influence states' positions in international environmental negotiations as well as governments' spending priorities.

Few things speak louder about a government's priorities than how it spends money and spending on subsidies is often particularly informative (Rickard 2012). Subsidies confer a benefit on select recipients via a financial contribution from the government. Some subsidies also contribute to the exploitation of natural resources by making possible economic activities that would not otherwise occur.

Author's note: I gratefully acknowledge the valuable feedback that I received on this project from Christina Davis, Yuch Kono, David Lake, Ed Mansfield, David Singer, Alice Tipping, participants at the 2020 Annual Meeting of the International Political Economy Society, and the reviewers and editors at ISQ. The data underlying this article are available on the ISQ Dataverse at https://dataverse.harvard.edu/dataverse/isq.

Rickard, Stephanie J. (2022) Interests, Institutions, and the Environment: An Examination of Fisheries Subsidies. *International Studies Quarterly*, https://doi.org/10.1093/isq/sqac003

For example, over 50 percent of high seas fishing would be unprofitable at its current scale without government subsidies (Sumaila et al. 2016).

As the case of fisheries subsidies demonstrates, some governments fund subsidies that harm the environment.[1] The United Kingdom spends 80 percent of its fisheries subsidies on programs that reduce the costs of doing business, including subsidies for bait, boats, and fuel. Many of these subsidies encourage more fishing than would otherwise occur (Martini 2018) and may subsequently result in over-fishing, that is, the removal of fish at a rate that cannot be replenished naturally (Schrank and Wijkström 2003). In contrast, other countries finance subsidies that help to conserve the environment and protect natural resources. New Zealand, for example, allocates 100 percent of its fisheries subsidies to environmentally friendly programs, including subsidies that help to offset the costs of determining sustainable catch limits (Sumaila et al. 2016).

The cross-national variation in government spending on environmentally friendly subsidies is puzzling given the dominant paradigm used to analyze environmental politics. For decades, scholars of International Relations have conceived of environmental issues as a collective action problem.[2] In this view, solving environmental problems requires the community production of public goods. However, models of strategic interaction raise doubts about the chances of sustained cooperation. As these models anticipate, international cooperation has been difficult to achieve and fisheries subsidies remain largely unregulated by international agreements. They are not covered by the WTO's Agreement on Subsidies and Countervailing Measures (ASCMs) and are exempt from the WTO Agreement on Agriculture (Davis 2004).

In the absence of binding international rules, many countries subsidize their fishing fleets and do so in ways that contribute to over-fishing. Total subsidies to the industry amount to more than 35 billion dollars annually and two-thirds of these subsidies increase capacity and make possible fishing beyond environmentally sustainable limits (Sumaila et al. 2019).

However, some countries unilaterally prioritize spending on environmentally friendly subsidies even in the absence of international cooperation, thereby defying the logic of collective action. How can this "voluntary restraint" be explained? The answer, I argue, lies squarely in domestic politics. Interest groups desiring environmentally friendly subsidies enjoy relatively more political influence in some countries, and it is in precisely these countries that democratically elected leaders are most likely to fund "green" subsidies, even when they are under no international obligation to do so. The question then is when and under what conditions do environmental groups enjoy such political influence?

I argue that interest groups' political influence depends on a country's electoral institutions and economic geography, which refers to the geographic distribution of economic activities. Geographically concentrated groups, like the fishing industry, enjoy a political advantage in countries with plurality electoral systems, single-member districts, and candidate-centered elections (e.g., Hansen 1990; Milner 1997; McGillivray 2004; Evans 2009). In contrast, geographically diffuse groups enjoy relatively more influence in countries with proportional electoral systems and party-centered electoral competition (Rickard 2018).

These dynamics have important implications for environmental policy because competing interest groups often have varied geographic characteristics. Extractive industries tend to be geographically concentrated because of their dependence on natural resources (Shelburne and Bednarzik 1993). The fishing industry is one such example; its reliance on fish stocks means that the industry tends to be clustered in select geographic areas. As a result, the fishing industry enjoys greater political clout in plurality electoral systems, where politicians compete to win votes in geographically defined constituencies. In proportional representation (PR) systems, where parties win legislative seats in proportion to their share of the national vote, the fishing industry enjoys relatively less political influence. In contrast, environmentalists tend to be more influential in PR systems than plurality systems due to their comparative geographic diffusion.

Using data on government spending on fisheries subsidies, I find evidence consistent with these expectations. Countries with proportional electoral systems and party-centered electoral competition tend to spend more money on environmentally friendly subsidies as a share of their total subsidy budget, all else equal. Additionally, controlling for electoral institutions, countries with more electorally successful Green parties tend to spend more money on environmentally friendly subsidies as a share of their total subsidy budget, all else equal. Countries with proportional electoral systems, party-centered electoral competition, and/or electorally successful Green political parties also tend to be leaders in international efforts to restrict environmentally damaging subsidies—a pattern that emerges from an analysis of the communications and draft texts submitted to the WTO's Negotiating Group on Rules.

This study makes three contributions. First, it provides a general theoretical framework to explain "trade-and-environment" policy outcomes. The framework demonstrates how policy outcomes in issue areas that involve both environmentalists and economic actors who rely on export markets to absorb at least some of their goods are shaped by a country's political institutions and economic geography. The framework also helps to explain states' positions in international environmental negotiations. The long-running failure to reach an agreement on fisheries subsidies at the WTO is rooted in the divergent processes of aggregating geographically concentrated economic interests through electoral systems around the world. In this way, the current study contributes to a long tradition in International Relations that acknowledges the importance of micro factors for explaining macro outcomes (e.g., Gourevitch 1978; Putnam 1988) and demonstrates how institutions within states can shape countries' international relations (Waltz 1959).

Second, this study contributes to the emerging literature on distributive climate conflict, which offers an alternative to thinking about environmental politics as a collective action problem (e.g., Cao et al. 2014; Aklin and Mildenberger 2020; Colgan, Green, and Hale 2021). While some scholars working in this literature have suggested that political institutions play a role in environmental politics (e.g., Lachapelle and Paterson 2013), the importance of geography has been largely overlooked. Ignoring geography would be innocuous if politicians elected via different institutions were equally responsive to concentrated (or diffuse) interests. But different electoral systems generate different incentives to represent geographically concentrated (or diffuse) groups, and the relative geographic concentration of

[1] Fisheries subsidies are government actions specific to the fisheries industry that increase the potential profits ok the industry in the short, medium, or long term (Schrank and Wijkström 2003).

[2] However, for an alternative perspective, see Colgan, Green, and Hale (2021) and Aklin and Mildenberger (2020).

groups with competing interests in environmental policy varies across issue areas. In some instances, environmentally damaging industries will be more concentrated than environmentalists, as in the case of the fishing industry. But in other circumstances, polluting industries may be more diffuse than environmentalists. For example, agricultural producers using fertilizer or pesticides that harm the ecosystem may be more widely dispersed across geographic space than environmentalists in some countries. The forestry sector also be more geographically diffuse than environmentalists, as discussed below. Given the varied geography of environmentally damaging economic activities, electoral institutions will have heterogeneous effects on environmental policy.

Third, this study examines the cross-national variation in policies with varied environmental impacts. Comparative studies of environmentally friendly policies remain relatively uncommon because few measures of green policies are comparable across countries. Given this challenge, existing research often focuses on environmental outcomes, such as pollution emissions (e.g., Scruggs 1999).[3] However, myriad factors affect environmental outcomes, including many that have nothing to do with government policy. Rather than examining outcomes, this study instead proposes a novel measure of green policy—one that is calculated using cross-nationally comparable budget data. This empirical strategy may be usefully adopted for other policy areas, such as fossil fuel subsidies.

Explaining Policy Outcomes

Why do some countries voluntarily prioritize spending on environmentally beneficial subsides in the absence of international coordination? The answer lies squarely in domestic politics. To retain office, governments take into account the preferences of key constituencies, or interest groups, when making policy decisions. Interest groups have more influence over policy when they enjoy greater political clout. Their political influence depends on a country's electoral institutions and economic geography. Economic geography refers the geographic distribution of economic activities, such as employment and production. Some economic activities cluster together in select parts of a country, while others are geographically dispersed throughout the nation. The geographic distribution of economic actors and voters with shared policy preferences is important because different electoral systems generate different incentives for politicians and parties to represent geographically concentrated (or diffuse) groups.

Geographically concentrated groups enjoy greater political influence in countries with plurality electoral systems, single-member districts, and candidate-centered electoral competition (e.g., McGillivray 2004). In such systems, politicians win office by securing a plurality of votes in their own geographically defined electoral district. To achieve this goal, politicians work to supply beneficial policies to their constituents, which may include government-funded subsidies or lax environmental regulations for industries located in the district.

Geographically concentrated groups enjoy relatively less political influence in countries with proportional electoral rules (PR) and party-centered elections (Rickard 2018). In PR systems, elections are not won district by district, and no single district is critical to the electoral success of a party in PR systems (McGillivray 2004). As a result, parties competing in PR systems are not overly concerned with winning votes in any given area.[4] In fact, responding to the demands of geographically concentrated groups may limit a party's national appeal and consequently their share of the national vote. This may be detrimental for parties competing in PR systems where legislative seats are awarded in proportion to their share of the vote.

Many PR systems stipulate a minimum share of the vote parties must win to hold seats in parliament. In order to clear this threshold, parties cannot be overly focused on the demands of geographically concentrated groups. In Norway, for example, a party called People's Action Future for Finnmark (*Folkeaksjonen Framtid for Finnmark*) focused on improving economic conditions for the fishing industry in the district of Finnmark. The party subsequently won 21.5 percent of the vote in Finnmark in 1989 (Aardal 2011). However, it won just 0.3 percent of the national vote. As a result, the party was not eligible for any of the seats allocated at the national level because it failed to clear the 4 percent threshold. As this example illustrates, parties competing in PR systems have incentives to pursue votes across the entire country, not just in a select region or electoral district, and given these incentives, parties in PR systems will tend to prioritize the interests of geographically diffuse groups.

In contrast, politicians competing for office in plurality systems have few incentives to cater to geographically dispersed groups. Appealing to diffuse groups neither sufficiently rewards their efforts nor maximizes their chances of reelection, which depends only on the support of voters in their own geographically defined electoral district. Catering to the demands of a diffuse group is an inefficient way for a politician to "buy" the votes she needs to win office in a candidate-centered, plurality system.

		Industry (I)	
		Concentrated	*Diffuse*
Environmentalists (E)	*Concentrated*	= power	E >I in plurality I >E in PR
	Diffuse	I >E in plurality E>I in PR	= power

Notes: Robust standard errors appear in parentheses; ***p < 0.01; ** p < 0.05, * p < 0.1.

These dynamics have important implications for environmental policy because groups with varied interests in protecting the environment often exhibit different geographic patterns. The two-by-two table above lays out four possible scenarios when two interest groups, environmentalists (E) and industry (I), compete to influence policy under different electoral institutions. Environmentalists lobby for policies that protect the environment, while industry groups, particularly those that pollute or exploit natural resources, tend to oppose policies that increase the costs of doing business, including environmental regulations. How governments resolve these competing demands hinges on the groups' relative political power, which depends on their geographic characteristics and the country's electoral institutions.

Case Selection

In two of the four boxes, the groups have similar geographic patterns and therefore similar levels of political influence.

[3] However, see Lundqvist (1980).

[4] Although see Catalinac and Motolinia (2021).

In these cases, no clear predictions emerge for policy outcomes. However, in the other two boxes, unambiguous predictions emerge from the theory as to which group will enjoy greater political influence. These two scenarios (the lower left-hand box and the upper right-hand box) generate testable hypotheses. Here, I focus on the lower left-hand box in which polluting industries are geographically concentrated relative to environmentalists. This box represents an important collection of environmental challenges. Extractive industries that rely on natural resources are highly geographically concentrated, and these cases, which include the oil and gas industries as well as other extractive activities like mining and fishing, have significant implications for the environment given the earth's finite resources.

From the range of cases characterized by the lower left-hand box, I investigate the fishing industry and specifically governments' fisheries subsidies. I explore this case for several reasons. First, examining fisheries subsidies helps to minimize concerns about causal complexity. The geographic patterns of the fishing industry are largely exogenous to politics and are instead a function of the industry's reliance on a natural resource: fish. Additionally, the large amounts of capital needed to discover and mine and gas reserves, which is often subsidized by governments, are not necessary to find fish stocks. As a result, the geography of the fishing industry is largely exogenous to politics and specifically subsidies.

In contrast, industries not reliant on a geographically concentrated natural resource like fish could strategically locate themselves to take advantage of a country's political system. Producers in plurality systems, for example, could tactically locate themselves in concentrated groups in order to maximize their chances of winning lax environmental regulations or particularistic economic policies, like subsidies. However, fishers have limited location options, and therefore, the geography of the fishing industry is largely exogenous to politics and electoral institutions.

Second, the fishing industry is highly concentrated geographically. In fact, the fishing industry is typically one of the most geographically concentrated industries in a country. In Russia, the fishing industry exhibits the highest levels of geographic concentration, as measured by employment data (Kiseleva et al. 2019). Fishing is the second most geographically concentrated industry in 10 European countries. In Sweden, fishing has the third highest level of geographic concentration after only petroleum and basic metal industries (Braunerhjelm and Borgman 2004). In Norway, half of the fishing industry's employees live in just three electoral districts (Rickard 2018). In the United Kingdom, only 7.5 percent of the country's local labor markets are dependent on fishing (Natale et al. 2013). Because of the acute geographic concentration of the fishing industry, the European Council officially recognizes geographically defined "Areas Dependent on Fishing" (Natale et al. 2013).

Given the fishing industry's consistently high levels of geographic concentration, this case allows for a meaningful comparison of fisheries subsidies across countries with different electoral systems. In contrast, many manufacturing industries exhibit different geographic patterns in different countries (Brülhart and Traeger 2005), which complicates the theoretical predictions for, and empirical testing of, other cases.

Third, fisheries subsidies have important implications for the future of the WTO. Talks over fisheries subsidies are a crucial test of whether or not the WTO is still capable of achieving meaningful multilateral outcomes. Failure to agree rules on fisheries subsidies may cast doubt on the institution's functioning, flexibility, and leadership. This may explain why government officials in Geneva rank concluding the negotiations on fishing subsidies as the WTO's most important priority, with some 90 percent of respondents giving this issue a high or very high score (Fiorini et al. 2021). The world's largest business organization, the International Chamber of Commerce (ICC), is anxious for an agreement on fisheries subsidies because it sees an agreement as crucial to the WTO's continued functioning as a credible arbiter of global commerce (World Economic Forum 2021).

Fourth, fishing subsidies represent a growing body of issues linking trade and the environment. In both academic scholarship and policy circles, there is a debate over whether environment policies are, can be, or even should be linked to restrictions on international trade. In this way, the ongoing talks over fisheries subsidies are unlike most WTO negotiations. Their goal is not just to ensure undistorted trade but also to deliver a global public good, in this case protecting the biodiversity of the world's oceans. Negotiations over fisheries subsides have the potential to build a new set of rules at the WTO: the first to explicitly consider the environmental impact of trade policies.[5] The WTO's ability to effectively address other "trade and environment" issues may be foreshadowed by their (in)ability to agree on fisheries subsidies.

Geography

The case of fisheries subsidies falls squarely in the lower left-hand box because of the geographic patterns of the key interest groups engaged with this policy issue. The fishing industry is typically one of the most geographically concentrated industries in a country because of its reliance on a natural resource located only in certain areas, as described above. In comparison, environmentalists tend to be more geographically diffuse. Environmentalists do not require access to specific natural resources. They can and do live in various regions throughout a country. In the United Kingdom, for example, one in 10 adults is a member or supporter of Britain's environment and conservation groups and these persons are found throughout the country (Vidal 2013). In the United States, members of environmental groups can be found in all 50 states.

Although environmentalists tend to be more geographically diffuse than the fishing industry, their numbers may nevertheless be "lumpy", that is, there may be more environmentalists in some parts of a country than others. California has the highest number of Green Party registered voters and Green Party voters as a percent of total registered voters (Kahn 2007). However, the Green Party has a presence in all fifty US states and the District of Columbia. Similarly, Vermont has the greatest concentration of environmental group members with 20.2 members per thousand population, while Mississippi has the lowest with 2.5 members per thousand (Mazur and Welch 1999). Nevertheless, members of environmental groups can be found in all 50 states, while the same is not true of the commercial fishing industry.

Interests

The key interest groups have varied preferences regarding fisheries subsidies, as well as different geographic patterns. In general, the interests of fishers and environmentalists are not always in opposition. Indeed, much of the fishing

[5] Although see Johnson (2015).

industry recognizes the importance of maintaining sustainable fish stocks and keeping the oceans clean. However, the two groups' preferences diverge over subsidies (Barkin et al. 2018). A proposal to eliminate environmentally harmful fisheries subsidies from the European budget, for example, solicited fierce opposition from the fisheries sector but strong support from environmental groups (Damanaki 2021).

Environmentalists oppose fisheries subsidies that generate over-capacity and subsequently lead to over-fishing. Such programs include subsidies to construct and purchase new vessels, to buy, transport, or store fishing equipment, and to build ports. These subsidies reduce the costs of doing business and make it more profitable to fish, thereby encouraging more fishing than would occur without subsidies. In Turkey, for example, the government provided subsidies that encouraged fishers to construct larger trawling vessels. The early financial success of the larger trawlers, together with lucrative government subsidies, lured others to enter the industry, which undermined the sustainability of fish stocks (Ostrom 1990). Reducing or eliminating these types of subsidies is the aim more than 160 environmental groups, including the World Wildlife Fund and Greenpeace, who signed a petition in 2020 urging an end to harmful fishing subsidies.

In contrast, the fishing industry lobbies governments for financial support. In England, for example, the National Federation of Fishermen's Organisations pressures the government for subsidies, sending briefing notes to coastal MPs and government ministers urging them to assist the industry financially. In Canada, the Maritime Fishermen's Union actively opposes cuts to subsidy spending, arguing that reducing fisheries subsidies would weaken the sector (Schrank and Wijkström 2003).

The fishing industry's demands often focus on input subsidies, which reduce the costs of items such as gear, bait, and ice (FAO 1993, 22). These types of subsidies provide a direct economic benefit to fishers by reducing the costs of doing business. Although the industry may suffer from over-fishing in the long run, the costs of over-fishing are delayed while the economic benefits from the catch today are immediate. Fish in the sea are valueless to fishers because there is no assurance that they will be there tomorrow if they are left behind today (Gordon 1954, 124). Each fisher is therefore motivated to catch more fish today, and to help them do so, they lobby the government for subsidies that lower the costs of doing business.

The fishing industry and environmentalists make competing demands on governments regarding fisheries subsidies. Whose demands prevail? I hypothesize that the fishing industry's demands are more likely to win out in countries with plurality electoral systems and candidate-centered elections. A subsidy for the geographically concentrated fishing industry is roughly analogous to legislative particularism, or "pork barrel" spending. Bringing "pork" back to their own district helps politicians cultivate a personal vote and increase their re-election chances in a plurality, single-member district system (e.g., Ferejohn 1972). And while the economic benefits of such a subsidy are concentrated in a politician's electoral district, the financial costs are dispersed to taxpayers across the country, and the environmental costs are dispersed throughout the world.

These dynamics help to explain why legislators in plurality systems push for fisheries subsidies. In the United Kingdom, for example, MPs representing coastal communities lobby for fisheries subsides, regardless of their party affiliation. An opposition MP from the coastal constituency of Workington in the north-west of Cumbria asked in the House of Commons, "If the Government really think fishing is the lifeblood of coastal communities, why are they not backing this up with the funding that the industry desperately needs?"[6] Similarly, a government-party MP from the coastal constituency of North Cornwall asked the government for "support for fishing communities".[7] Likewise, in Canada, legislators from both sides of the aisle opposed cuts to the Fishing Vessel Assistance Programme that subsidized the purchase of fishing vessels.

In PR systems, environmentalists' demands for green subsidies will tend to prevail over the fishing industry's demands for at least two reasons. First, in proportional systems, legislative seats are awarded in accordance with parties' vote shares. As a result, parties competing in PR systems have powerful incentives to pursue votes across the entire country, as argued above. Second, electoral systems influence how many parties compete for seats in the legislature (e.g., Rae 1967). PR typically allows for the emergence of more parties than plurality (e.g., Grofman and Lijphart 2002). As a result, Green political parties tend to be more common and more electorally successful in PR systems than plurality systems (Mair 2021). I therefore hypothesize that the demands of environmentalists will be more likely to prevail over the demands of the fishing industry in PR systems, and as a result, governments' portfolio of fisheries subsidies will include a larger share of environmentally friendly subsidies in PR systems as compared to plurality systems.

Examining Fisheries Subsidies

Around the world, governments spend more than 35 billion dollars a year on fisheries subsidies (Sumaila et al. 2019). Governments can spend these funds in more or less environmentally friendly ways because different types of fisheries subsidies have varied impacts on the environment. Research by ecologists and marine scientists finds that some fisheries subsidies cause more damage to the environment than others, while some fisheries subsidies actually benefit the environment (e.g., Sumaila et al. 2016).

I estimate the share of governments' fisheries subsidies spent on environmentally friendly programs using data from the OECD's Fisheries Support Estimate (FSE) database.[8] Using these data, I construct two measures of the share of fisheries subsidies spend on environmentally friendly or "green" programs. For both measures, the denominator equals total government spending on general service fisheries subsidies, which provide financial support to the sector. Government support for the fishing industry is predominately supplied in the form of general services subsidies (OECD 2017).[9]

The first measure of "green" subsidy shares has as its numerator the sum of government spending on two subcategories within the general services subsidies category: (1) subsidies for research and development and (2) subsidies for the management of resources. Ecologists and marine scientists agree that subsidies for the management of fish resources, as well as research and development, do not harm the environment and may, in some cases, have a positive impact on fish stocks and sustainability (Sumaila et al. 2016). Management subsidies, for example, help to offset the costs

[6] Sue Hayman, Hansard, July 4, 2018, Volume 644.
[7] Scott Mann, Hansard, October 19, 2016, Volume 615.
[8] These data report information on budgetary transfers to fisheries.
[9] Also referred to as "support for services to the sector" in the OECD's current nomenclature.

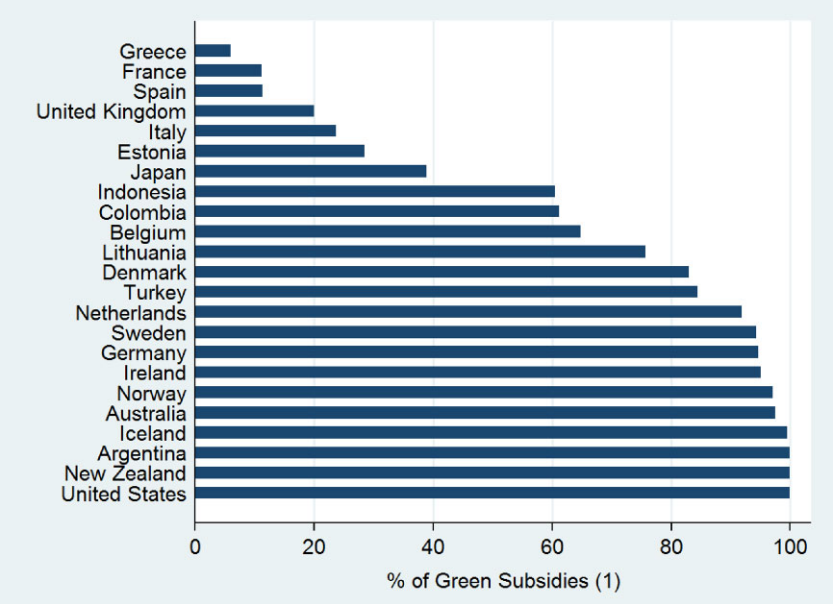

Figure 1. Share of green fisheries subsidies.

of studying fish stocks, determining sustainable catch limits, and support the monitoring and enforcement of catch limits.

The second measure of green subsidies equals the share of spending on general service fisheries subsidies devoted exclusively to research and development. While experts agree that subsidies for both research and development and management contribute least to overcapacity and overfishing, some argue that subsidies for research and development come closest to public goods (OECD 2017). Because their incidence is at some distance from production activity, research and development subsidies have an even smaller chance of negatively impacting fish stocks than management subsidies (OECD 2017).

Figure 1 illustrates the variation in green subsidy shares across countries. For each country, the share of green subsidies is averaged over the period from 2008 to 2018 using the first measure described above, namely the share of spending on general service fisheries subsidies devoted to research and development as well as the management of resources.

As figure 1 demonstrates, some countries spend significantly more of their fisheries subsidy budget on green programs than others. New Zealand, for example, allocates 100 percent of fisheries subsidies to green programs. This has face validity given the well-documented and extensive reforms New Zealand made to their fishing subsidies to reduce overfishing, including the voluntary withdrawal of all subsidies that negatively affect fish populations (FAO 1993; OECD 2017). In Norway, 90 percent of fisheries subsidies go to green programs, which is consistent with Norway's demonstrated commitment to environmentally sustainable fishing, including a vessel buyback program designed to reduce capacity (Schrank and Wijkström 2003).

In contrast, the United Kingdom spends just 20 percent of its fisheries subsidies on green programs. The other 80 percent goes to subsidies that reduce the costs of doing business. For example, a subsidy scheme in force from 1982 until 2001 provided money to first-time shareholders for the purchase of a share in a new or existing fishing vessel. The financial assistance was granted on the condition that the vessel would be used for full-time fishing for the following five years. Another example from the United Kingdom is a subsidy provided to assist with the purchase of a fish offloading crane to enable factories to discharge larger vessels. By facilitating larger vessels, this subsidy generated incentives for fishers to invest in larger boats with greater catch potentials.

Greece spends less than 10 percent of its subsidy budget on environmentally friendly subsidies. The relatively low share of green subsidies in the country's subsidy portfolio is consistent with Greece's general performance regarding environmentally sustainable fishing. The average quantity of fish caught via environmentally destructive trawl nets in the open sea by the Greek fishing industry increased from 1992–2003 to 2004–2015 (Tegos, Onkov, and Stoyanova 2017).

Key Explanatory Variables

To investigate the extent to which green subsidy shares vary with countries' electoral institutions, I use data from Bormann and Golder (2013) to identify the electoral rules adopted in national-level (lower house) legislative elections. Countries are classified as having one of three electoral systems: (1) plurality (or, more precisely, majoritarian),[10] (2) proportional, or (3) mixed. Mixed systems exist where voters elect representatives using two different electoral rules.[11]

I also use an alternative indicator of the incentives facing politicians and political parties. This measures illustrates candidates' access to the ballot and comes from Johnson and Wallack (2012) who build upon canonical insights from Carey and Shugart (1995). The categorical variable indicates three possibilities: (1) political parties control

[10] A majoritarian system is one in which the candidates or parties that receive the most votes win.

[11] A country's system is classified as mixed if more than 5 percent of the total legislature is elected by a different electoral formula from that used to elect the other deputies.

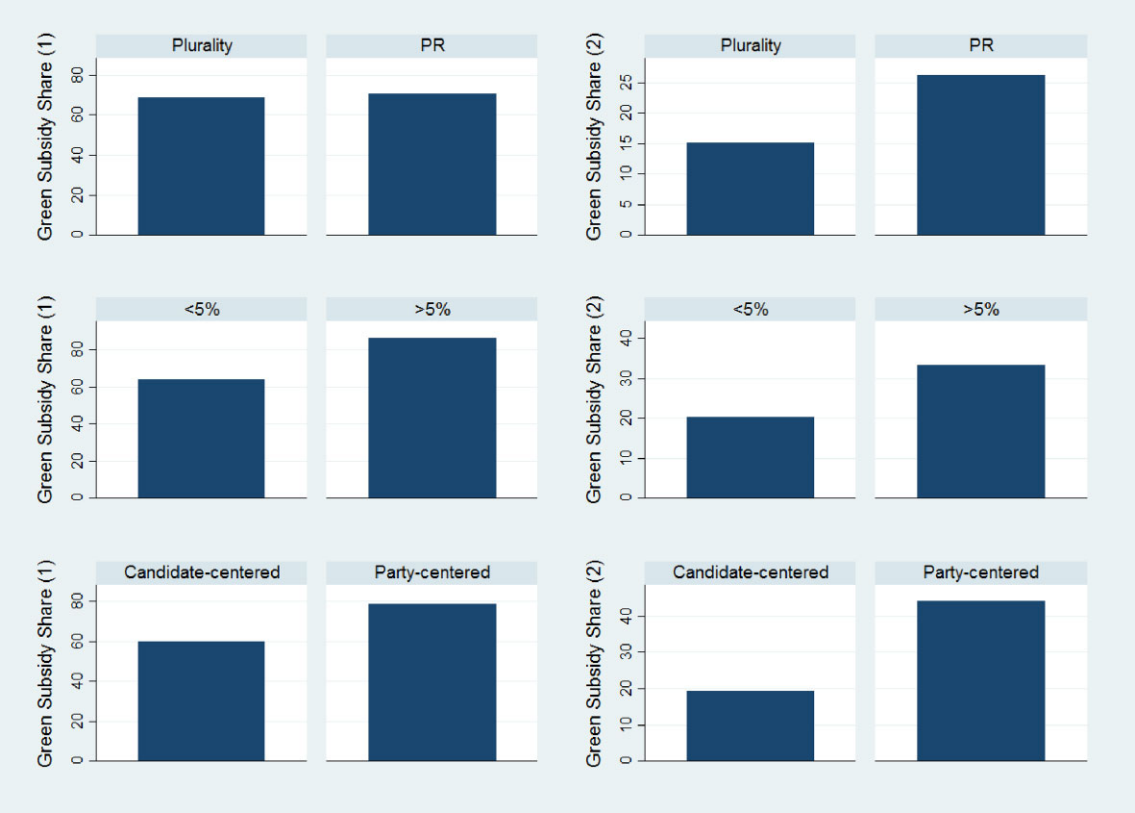

Figure 2. Mean subsidy shares.

both candidates' access to the ballot and the order in which candidates fill the party's legislative seats (closed list/party-centered); (2) parties control access to the ballot but not the order in which candidates fill the party's legislative seats (open list); or (3) parties control neither access nor order (candidate-centered).

When parties control both candidates' access to the ballot and the order in which they fill the party's legislative seats—a system referred to as "closed-list"—voters cannot express a preference for individual candidates at the ballot box. In fact, candidates' names may not even appear on the ballot. Voters instead cast their vote for a political party, and party leaders then decide which individuals will fill the party's legislative seats. As a result, electoral competition is party-centered rather than candidate-centered. To maximize their chances of being in parliament, individual politicians work to appeal to party leaders and maximize the party's vote share, which leads them to prioritize the demands of geographically diffuse groups.

In contrast, when parties control neither candidates' access to the ballot nor the order in which candidates fill a party's legislative seats, candidates must appeal directly to voters in their own district to win office. As a result, the demands of geographically concentrated groups, like the fishing industry, tend to have relatively greater influence in candidate-centered systems.

I also include a measure of Green parties' vote shares in national-level (lower house) legislative elections in the same year or closest previous year to the subsidy. Data on Green parties' vote shares come from the ParlGov database and countries' electoral records. I focus exclusively on Green parties' vote shares as a conservative estimate, but other political parties may also support green policies. I exclude Green parties that run for office in a formal coalition with other parties. For example, Portugal's Ecologist Party (PEV) is closely allied with the Portuguese Communist Party, and together they make up the Unitary Democratic Coalition (UDC). Because voters cast their vote for the coalition (i.e., UDC) rather than the individual parties, it is not possible to uncover the Green party's own share of the vote.

Descriptive Statistics

Systematic differences in countries' green subsidy shares are illustrated in figure 2. The first row reports the average green subsidy shares in plurality countries and PR countries. The left-hand column uses the first measure of green subsidy shares, and the right-hand column uses the second measure. On average, PR countries spend a larger share of their subsidy budget on environmentally friendly programs than plurality countries, as illustrated by the first row.[12]

The second row reports the average green subsidy share in countries where Green political parties have, on average, either more or less than 5 percent of the vote share in legislative elections. Green subsidy shares are higher in countries with more electorally successful Green political parties. The difference for both measures is statistically significant at the 95 percent level in a two-tailed test.

The third row compares the average green subsidy shares in countries with either candidate-centered or party-centered (closed list) electoral competition. Green subsidy shares are higher in countries with party-centered electoral competition than in countries with candidate-centered

[12] The difference is statistically significant at the 95 percent level in a two-tailed test for the second measure of green subsidy shares.

Table 1. Estimated effect on percentage of green subsidies (measure 1)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
PR	18.702**	20.145**	21.410**	27.687***	18.426*	14.956	27.416***	20.645***
	(9.067)	(8.430)	(10.754)	(8.009)	(9.682)	(9.843)	(9.576)	(6.115)
Mixed	27.249**	27.738***	28.283***	39.051***	25.317**	20.990*	25.046***	31.126***
	(11.041)	(10.032)	(10.622)	(10.403)	(11.813)	(11.588)	(9.490)	(8.805)
Green vote share		2.031***	1.912***	2.107***	1.884***	1.650***	1.617***	1.249***
		(0.390)	(0.642)	(0.380)	(0.478)	(0.445)	(0.398)	(0.360)
GDP per capita	0.474***	0.371***	0.369***	0.252**	0.357***	0.410***	0.333***	0.484***
(lag, thousands)	(0.100)	(0.108)	(0.109)	(0.112)	(0.124)	(0.105)	(0.111)	(0.103)
Boats	−0.026	−0.014	−0.018	−0.038	−0.010	−0.007	−0.024	−0.039
(lag, thousands)	(0.024)	(0.020)	(0.025)	(0.023)	(0.021)	(0.018)	(0.025)	(0.027)
Island			2.499					
			(9.644)					
Coastline (km, nl)				4.810***				
				(1.571)				
Population (lag, nl)					−0.908			
					(2.485)			
GDP (lag, nl)						−2.502		
						(2.387)		
CPTPP							21.574**	
							(9.385)	
EU								−26.418***
								(4.851)
Constant	35.681***	30.024***	29.050**	−14.764	47.592	101.561	26.141***	42.143***
	(9.857)	(9.862)	(11.171)	(16.319)	(49.201)	(69.010)	(9.853)	(8.189)
Observations	136	136	136	136	136	136	136	136
R-squared	0.128	0.217	0.217	0.258	0.218	0.224	0.242	0.352

Notes: Robust standard errors appear in parentheses; ***p < 0.01; ** p < 0.05, * p < 0.1.

elections. The differences for both measures are statistically significant at the 95 percent level in a two-tailed test.

While illustrative, these descriptive statistics and difference of means tests may obscure other systematic differences between the groups. I therefore estimate a partial-adjustment regression by ordinary least squares (OLS) using pooled time-series cross-sectional data on green subsidy shares with the following form:

$$\textit{Green Subsidy Share}_{it} = \beta_0 + \beta_1\ \textit{Electoral Institutions}_{it} + \beta X_{it-1} + \epsilon_{it}$$

where i indicates country, t indicates the year, βX_{it-1} is a vector of control variables that includes GDP per capita, the size of a country's fishing industry, a dichotomous indicator for island nations, the length of a country's coastline, population, GDP, signatories of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), and EU member states. ϵ_{it} is a robust error term.

Results

Governments in countries with proportional electoral systems spend a larger share of their fisheries subsidies on environmentally friendly programs as compared to plurality systems, all else equal. On average, green subsidy shares are 22 percentage points higher in countries with proportional electoral systems than plurality systems.[13] Twenty-two percentage points is equivalent to approximately 65 percent of the sample's standard deviation. The positive and significant correlation between PR and green subsidy shares is robust to the inclusion of Green party vote shares.[14] Holding constant the vote share garnered by Green parties, countries with PR systems have higher average shares of green subsidies than countries with plurality systems.

When Green political parties win a larger share of votes in legislative elections, governments spend more of their fishing subsidies on environmentally beneficial programs, all else equal. This result is statistically significant at the 1 percent level in all estimated models. It is also substantively important. An increase in Green party vote share by one standard deviation (5.13 percent) corresponds with a 9.1 percentage point increase in the share of subsidies allocated to environmentally friendly programs.

The estimated impact of both electoral systems and Green parties is robust to the inclusion of the control variables. All models in table 1 include GDP per capita as a control. On average, countries with higher levels of GDP per capita spend more of their subsidy budget on environmentally friendly programs. An increase in GDP per capita of one standard deviation corresponds with a 7.7 percentage point increase in green subsidy shares. This may be because higher levels of GDP per capita correlate with a higher prevalence of post-material values (Inglehart 2008), which inspire greater public support for environmental protection (e.g., Franzen 2003). When countries make substantial progress in meeting economic and sustenance needs, a growing proportion of the population shifts their attention to post-material goals and quality of life issues, and this shift may lead them to support policies that protect the environment (Dalton 2005).

All of the models in table 1 also include a control for the size of a country's fishing industry. Governments facing larger fishing industries may come under greater pressure to support the industry via capacity-enhancing subsidies. To measure the size of the fishing industry, I use data from the OECD on the total number of vessels in a country's fishing fleet. This value is lagged one year in all models.

Model 3 includes a dummy variable coded 1 for island nations and 0 otherwise. Model 4 includes the length of a

[13] Average of all statistically significant coefficients.

[14] In fact, the addition of Green party vote shares increases the magnitude of the coefficient on PR by 7.7 percent.

country's coastline in kilometers (logged). Model 5 includes the natural log of a country's population. Model 6 includes the natural log of GDP. The inclusion of GDP reduces the magnitude of the coefficient on PR and Green party vote share. Although the coefficient on PR falls below conventional levels of statistical significance, the Green party vote share remains robust.

Model 7 includes a dummy variable coded one for countries that have ratified the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).[15] The CPTPP requires that "the parties commit to combat illegal, unreported, and unregulated (IUU) fishing and promoting sustainable fisheries management, including through substantive obligations to prohibit subsidies that negatively affect fish stocks." The CPTPP took effect in 2018, the last year included in my sample. However, its predecessor the Trans-Pacific Partnership (TPP) was signed in 2016, and prior to 2016, countries may have begun to reform their fisheries subsidies in anticipation of the treaty's ratification. I therefore code the CPTPP membership variable as one for all of the sample years for the relevant member countries.

Membership in CPTPP is positively correlated with green subsidy shares. Countries that are members of CPTPP spend nearly 22 percentage points more on green subsidy shares than non-members, all else equal. The effect of CPTPP membership is nearly equal in size to the effect of proportional electoral rules, suggesting that the incentives generated by international agreements can have as large an impact on policy as domestic institutions (Davis and Oh 2007).

Model 8 includes a dummy variable coded 1 for EU member states and zero otherwise. EU members' support for the fishing industry may be influenced in scope and volume by EU structural support programs, such as the European Maritime and Fisheries Fund. However, the key results remain robust to the inclusion of EU membership. Countries with more electorally successful Green parties have larger green subsidy shares, countries with party-centered electoral competition have larger green subsidies shares, and countries with proportional electoral rules have larger green subsidy shares, controlling for EU membership.

EU membership itself is negatively correlated with green subsidy shares. This finding is consistent with other studies that cast doubt on the EU's green credentials with regard to fisheries subsidies. A 2020 report by the European Court of Auditors found that only a 6 percent of the European Maritime and Fisheries Fund was used to support marine conservation. The auditors also found that the Mediterranean remained significantly overfished. A separate report found that from 2014 to 2020, one billion euros were channelled through capacity-enhancing subsidies, representing 40 percent of the EU total (Skerritt 2020).

Robustness Check

As a robustness check, I re-estimate all models using the second measure of green subsidies, which equals the share of general service subsidies devoted exclusively to research and development. Using this measure increases the sample size by nearly 6 percent.

As before, governments in PR countries spend a larger share of their fisheries subsidies on environmentally friendly programs, as compared to plurality countries, holding all else equal.[16] On average across all models, green subsidy shares are 14 percentage points higher in countries with PR systems than plurality systems, all else equal.[17] The positive and significant correlation between proportional electoral systems and green subsidy shares is robust to the inclusion of Green party vote shares.

Countries with more electorally successful Green parties spend more on green subsidies, all else equal. An increase in Green party vote share by 1 percentage point corresponds with a 1.1 percentage point increase in green subsidy shares.[18]

All models in table 2 include GDP per capita as a control variable. However, GDP per capita does not reach conventional levels of statistical significance in table 2.

All models in table 2 also control for the size of a country's fishing industry. In table 2, the size of the fishing industry is robustly and negatively correlated with green subsidy shares. Countries with larger fishing industries spend less of their fisheries subsidy budget on environmentally friendly programs. Using the most conservative estimate, an increase in the size of the fishing industry by one standard deviation reduces the share of green subsidies by 12 percentage points. This result suggests that larger fishing industries tend to be more successful in their efforts to win generous input subsidies from the government.

Model 3 includes a dichotomous indicator of island nation states. It is positively signed in both tables 1 and 2. However, it only reaches conventional levels of statistical significance in table 2. As in table 1, a country's coastline measured in (logged) kilometers is positively correlated with green subsidy shares. In both tables, the estimated coefficient is statistically significant. Population remains statistically insignificant in table 2. The negative coefficient on GDP is statistically significant at the 90 percent level in a two-tailed test in table 2. The inclusion of GDP in model 6 reduces the magnitude of the PR effect. However, the coefficient remains large and statistically significant. Moving from a plurality system to a PR system is estimated to increase green subsidy shares by 7.4 percentage points, controlling for GDP. As before, CPTPP membership is positively and robustly correlated with green subsidy shares, while EU membership is negatively and robustly correlated with green subsidy shares.

Electoral Competition

Tables 3 and 4 investigate how the nature of electoral competition influences government spending on green subsidies. Table 3 uses the first measure of green subsidies, and table 4 uses the second measure. The nature of electoral competition is measured using a categorical variable that indicates one of three possibilities, as described above. The excluded group in all models is candidate-centered elections, that is, countries where political parties control neither candidates' access to the ballot nor the order in which they are allocated to the party's legislative seats.

I hypothesize that countries with closed lists and, therefore, party-centered elections will have higher green subsidy shares than countries with candidate-centered elections. In closed list systems, party leaders decide which candidates will fill the party's legislative seats, and as a result, the incentives of candidates and party leaders align. Both work to maximize the party's vote share, and to this end, they ensure that subsidies flow to geographically diffuse, vote-maximizing groups rather than individually powerful legislators' constituencies (Golden and Picci 2008). As a result,

[15] See Bastiaens and Postnikov (2017) for an investigation other preferential trade agreements' (PTAs') environmental impacts.

[16] Similar results emerge from a two-stage least squares model where the age of a country's electoral institutions is used as an instrument for the country's electoral rule and the nature of electoral competition in the first stage of the model.

[17] Average of coefficients for all eight models reported in table 2.

[18] Average of coefficients from all models in table 2.

Table 2. Estimated effect on percentage of green subsidies (measure 2)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
PR	12.019***	12.633***	18.005***	19.211***	9.782**	7.395*	17.259***	12.625***
	(3.711)	(3.001)	(4.088)	(2.883)	(4.139)	(3.970)	(2.861)	(2.213)
Mixed	13.275***	13.287***	15.742***	22.487***	9.178	6.364	11.356***	15.154***
	(4.470)	(3.827)	(3.601)	(3.772)	(5.712)	(5.367)	(3.651)	(3.231)
Green party vote share		1.316***	0.827**	1.438***	1.063***	0.917***	1.031***	0.847***
		(0.245)	(0.399)	(0.208)	(0.359)	(0.326)	(0.313)	(0.244)
GDP per capita	0.077	0.006	−0.002	−0.094	−0.019	0.047	−0.020	0.078
(lag, thousands)	(0.091)	(0.095)	(0.095)	(0.101)	(0.098)	(0.095)	(0.098)	(0.077)
Boats	−0.035***	−0.027***	−0.043***	−0.048***	−0.021**	−0.020***	−0.034***	−0.043***
(lag, thousands)	(0.008)	(0.007)	(0.012)	(0.009)	(0.008)	(0.006)	(0.009)	(0.011)
Island			10.550*					
			(5.400)					
Coastline (nl)				4.184***				
				(0.797)				
Population					−1.567			
(lag, nl)					(1.594)			
GDP						−2.626*		
(lag, nl)						(1.393)		
CPTPP							14.868***	
							(4.192)	
EU								−16.103***
								(3.180)
Constant	13.152**	9.979*	5.833	−29.040***	40.260	84.980**	7.662*	17.778***
	(5.161)	(5.192)	(5.141)	(6.533)	(31.231)	(40.727)	(4.557)	(5.826)
Observations	144	144	144	144	144	144	144	144
R-squared	0.078	0.174	0.195	0.264	0.179	0.193	0.205	0.305

Notes: Robust standard errors appear in parentheses; ***p < 0.01; ** p < 0.05, * p < 0.1.

geographically concentrated groups, like the fishing industry, tend to find themselves without a champion in closed-list systems, particularly at the national level.

As anticipated, green subsidy shares are higher, on average, in countries with closed party lists and party-centered electoral competition than in countries with candidate-centered competition. The estimated coefficient on *Closed List PR* is statistically significant in thirteen of the sixteen models reported in tables 3 and 4. In table 3, moving from a candidate-centered system to a closed-list, party-centered system corresponds with an increase in green subsidy shares of 17.5 percentage points.[19] The average estimated coefficient in table 4 indicates that moving from a candidate-centered system to a closed-list, party-centered system corresponds with a 24.6 percentage point increase in the share of fishing subsidies going to green programs.

While there is general agreement that closed-list systems are the most party-centered, far less agreement exists about precisely how to classify open-list systems (André, Depauw, and Martin 2016). Some open-list PR systems are more candidate-centered than plurality systems (André, Depauw, and Martin 2016), and this may explain why the estimated coefficients on *Open List PR* are positive but not consistently different from zero. They are statistically significant in only eight of the sixteen models reported in tables 3 and 4.

Green parties' vote share is positively and robustly correlated with green subsidies in all of the models reported in tables 3 and 4. On average, countries with more electorally successful Green parties spend more of their fisheries subsidy budget on green programs. As table 3 reports, increasing Green parties' vote share by one standard deviation corresponds with a 7.75 percentage point increased in green subsidy shares. This increase accounts for nearly 25 percent of the variance in green subsidy shares. In table 4, increasing Green parties' vote share by one standard deviation corresponds with a 4.54 percentage point increase in green subsidy shares, which accounts for nearly 14 percent of the variance in green subsidy shares.

International Implications

Sustaining global fish stocks requires coordinated international action. WTO Members have tried—but failed—to agree on rules restricting capacity-enhancing fisheries subsidies. The deadlock is rooted in domestic politics. Countries' hold different positions on fisheries subsidy controls, in part, because of their varied electoral institutions. Electoral institutions, together with economic geography, determine the relative political power of competing interest groups at home, and, in turn, these interests shape countries' spending decisions and positions in international environmental negotiations.

Qualitative evidence of these dynamics can be found in WTO documents. Although WTO negotiations take place behind closed doors, many of the communications and draft proposals submitted by countries to the WTO's Negotiating Group on Rules are publicly available.[20] To discern countries' positions in the fisheries negotiations, I analyze the content of all of the communications and draft texts submitted by countries (and coalitions of countries) to the WTO's Negotiating Group on Rules from January 2016 to December 2019. Using these data, I identify the countries that are most (New Zealand and Iceland) and least (India) supportive of international restrictions on fisheries subsidies.

[19] Average of statistically significant coefficients.

[20] https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm.

Table 3. Estimated effect of electoral competition on percentage of green subsidies (measure 1)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Closed list	18.929**	15.535*	15.672*	15.407*	10.908	8.823	21.798**	6.238
	(9.121)	(9.027)	(9.402)	(8.842)	(10.358)	(10.250)	(10.079)	(6.543)
Open list	19.163***	15.496**	15.706**	18.583***	11.580*	10.480	19.415***	23.057***
	(6.812)	(6.544)	(7.146)	(7.060)	(6.643)	(6.501)	(6.724)	(7.649)
Green vote share		1.860***	1.825***	1.846***	1.402***	1.305***	1.347***	0.856**
		(0.404)	(0.667)	(0.392)	(0.472)	(0.440)	(0.441)	(0.350)
GDP per capita	0.324**	0.268**	0.267*	0.173	0.272*	0.419***	0.216	0.349***
(lag, thousands)	(0.131)	(0.133)	(0.136)	(0.145)	(0.139)	(0.148)	(0.136)	(0.124)
Boats	−0.022*	−0.009	−0.011	−0.023	0.003	0.003	−0.022	−0.047**
(lag, thousands)	(0.013)	(0.012)	(0.019)	(0.015)	(0.015)	(0.013)	(0.018)	(0.020)
Island			0.641					
			(8.403)					
Coast				2.551				
(nl, kilometers)				(1.823)				
Population					−3.439			
(lag, nl)					(2.551)			
GDP						−4.553*		
(lag, nl)						(2.418)		
CPTPP							20.625***	
							(6.089)	
EU								−30.431***
								(7.246)
Constant	45.745***	41.962***	41.913***	22.361	102.386**	163.445**	40.849***	59.577***
	(6.137)	(6.815)	(6.884)	(16.556)	(44.911)	(64.276)	(6.848)	(8.210)
Observations	131	131	131	131	131	131	131	131
R-squared	0.157	0.229	0.229	0.241	0.243	0.257	0.260	0.365

Notes: Robust standard errors appear in parentheses; ***p < 0.01; ** p < 0.05, * p < 0.1.

The countries most supportive of international efforts to restrict environmentally damaging fisheries subsidies, New Zealand and Iceland, have proportional electoral systems (or mixed-member proportional [MMP] systems), party-centered electoral competition, and electorally successful Green parties. Iceland has a pure PR system with closed party lists. New Zealand has an MMP representation system where approximately 42 percent of the legislative seats are filled via PR using nation-wide closed party lists, while the remainder are filled via plurality. In this system, even if a party does not win a seat via the plurality vote, they can win seats in House of Representatives if they receive 5 percent or more of the party (PR) vote. In the 2008 election, for example, the Green Party failed to win any electorate (plurality) seats but won 6.7 percent of the party (PR) vote and, as a result, earned nine seats in Parliament.[21] As this example shows, appealing to geographically diffuse groups of voters with shared interests, such as environmentalists, can be a successful election strategy given New Zealand's electoral institutions.

New Zealand and Iceland lead international efforts to restrict fisheries subsidies. In 2017, New Zealand and Iceland together proposed ambitious limits to the WTO Rules Committee.[22] They championed prohibitions on three types of subsidies: (1) subsidies for IUU fishing, (2) subsidies for fishing activities in areas where stocks are not assessed or are assessed as being overfished, and (3) subsidies for high-seas fishing and fishing in the waters of another country. They argued that these prohibitions should apply equally to all Members, including developing countries. In 2018, New Zealand and Iceland went even further. In a new joint submission, they proposed that all subsidies contributing to overcapacity should be limited.[23]

These countries' support for international restrictions on environmentally damaging subsidies may be due, in part, to domestic subsidies, which are the product of electoral institutions and economic geography, as I demonstrate above. When domestic policies are environmentally friendly, interest groups at home may push governments to "internationalize" their green policies (DeSombre 2000). Economic actors, like fishers, benefit when international standards are comparable to the environmental standards at home (Kelemen and Vogel 2010). Fishers who receive few subsidies to offset the costs of doing business are at a disadvantage when competing against fishers from countries that heavily subsidize items like fuel and gear. Competing against fishers that benefit from capacity-enhancing subsidies puts non-subsidized fishers at a disadvantage—both in terms of their capacity to catch and also in terms of trade. As a result, the fishing industry in countries with large green subsidy shares, like New Zealand, may support international restrictions on capacity-enhancing subsidies to help level the playing field.

Despite the efforts of New Zealand and Iceland, no agreement has yet been reached at the WTO to limit fisheries subsidies of any kind. Opposition comes from developed and developing countries alike, including those with plurality electoral rules, such as India.[24] India's electoral institutions delineate 543 single-member constituencies in which legislators are elected via a simple majority vote. India's relatively long coastline ensures that many legislators have

[21] https://www.elections.nz/democracy-in-nz/what-is-new-zealands-system-of-government/2012-mmp-review/.

[22] Document TN/RL/GEN/186.

[23] Document TN/RL/W/275.

[24] Former European Marine Commissioner, Maria Damanakia, observed that fisheries subsidies do not generate the traditional conflict between developing and developed states.

Table 4. Estimated effect of electoral competition on percentage of green subsidies (measure 2)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Closed list PR	26.674***	24.751***	25.362***	24.531***	23.614***	22.525***	29.309***	20.310***
	(5.121)	(5.192)	(5.328)	(5.063)	(6.335)	(6.364)	(5.579)	(4.595)
Open list PR	4.891	2.562	3.561	5.067	1.601	0.917	5.509*	5.589
	(3.242)	(3.271)	(3.513)	(3.431)	(3.742)	(3.672)	(3.127)	(3.662)
Green vote share		1.060***	0.902**	1.072***	0.946***	0.875***	0.660**	0.639***
		(0.244)	(0.349)	(0.234)	(0.263)	(0.249)	(0.269)	(0.232)
GDP per capita	−0.108	−0.142*	−0.150*	−0.213**	−0.142*	−0.094	−0.180**	−0.105
(lag, thousands)	(0.079)	(0.078)	(0.078)	(0.086)	(0.080)	(0.097)	(0.076)	(0.075)
Boats	−0.029***	−0.022***	−0.027***	−0.033***	−0.019**	−0.018***	−0.032***	−0.038***
(lag, thousands)	(0.004)	(0.005)	(0.009)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)
Island			2.947					
			(3.863)					
Coast				1.955**				
(nl, kilometers)				(0.771)				
Population					−0.855			
(lag, nl)					(1.320)			
GDP						−1.503		
(lag, nl)						(1.219)		
CPTPP							16.303***	
							(2.844)	
EU								−12.834***
								(3.811)
Constant	23.134***	21.241***	21.012***	6.081	36.306	61.453*	20.451***	28.906***
	(3.216)	(3.533)	(3.545)	(6.961)	(22.692)	(32.051)	(3.398)	(4.827)
Observations	139	139	139	139	139	139	139	139
R-squared	0.281	0.343	0.345	0.363	0.345	0.351	0.394	0.407

Notes: Robust standard errors appear in parentheses; ***p < 0.01; ** p < 0.05, * p < 0.1.

fishers in their districts, and this fact coupled with the country's first-past-the-post electoral system, may help to explain, at least in part, why India opposes international restrictions on fisheries subsidies. Legislators may hope to curry favor with fishers in their district by maintaining fisheries subsidies.

In a communication submitted by India to the WTO June 2019, the government argued that they, and other developing countries, should be exempt from fisheries subsidy controls, including restrictions on subsidies that support IUU.[25] Although India's position is in keeping with their long-standing support for "special and differential treatment" for developing countries, their stance seems to go beyond this general point of principal to reflect genuine and specific opposition to fisheries subsidy controls. For example, India opposed any restrictions on subsidies for catches within a country's territorial waters or up to 200 nautical miles from the shore.[26]

Other plurality countries also display something less than a sense of urgency in agreeing to limits on fisheries subsidies. The United States—a country with single-member districts, plurality electoral rules and candidate-centered electoral competition—recently decided to expand the scope of the talks to include provisions against forced labor on fishing boats (Beattie 2021). Although other international agreements already address labor rights, the United States insisted on bringing this issue into the fisheries talks. Bringing in new issues at this stage will inevitably delay further any agreement on fisheries subsidies. And adding new issues is certainly not the action of a government looking for a quick solution to the global problem of over-fishing.

In sum, evidence from countries' submissions to the WTO provide suggestive evidence of the importance of domestic politics in international environmental negotiations. Of course, neither this evidence nor the quantitative evidence presented above can prove that electoral systems *cause* states' positions in international environmental negotiations or spending patterns. Rather, it suggests that there is an association between countries' electoral institutions and the likelihood that governments adopt environmentally friendly positions in international negotiations and national budgeting decisions. The qualitative evidence further suggests that states' heterogeneous interests present a challenge for international environmental cooperation, which implies that insights from studies of local common pool resources—where heterogeneous interests also pose a risk to cooperation—may help to illuminate the potential for cooperation over global common pool resources (Ostrom 1990; Keohane 2010).

Discussion

Domestic politics can either prevent or promote international environmental cooperation; it depends on the constellation of institutions, interests, and economic geography. When facing geographically concentrated polluters or extractive industries, environmentalists will have greater political influence in countries with proportional electoral rules. Environmentalists' political clout in such cases will generate greener, more environmentally friendly policy and greater support for international environmental cooperation, as I demonstrate here. Such outcomes are especially likely in

[25] Document TN/RL/GEN/200.
[26] Document TN/RL/GEN/200.

countries with party-centered electoral competition, which emerges in PR systems with closed party lists.

These findings are consistent with other studies that also show PR systems produce greener outcomes than plurality systems (e.g., Fredriksson and Millimet 2004). However, the theory advanced here cautions that these results should not be interpreted as evidence that proportional electoral systems can solve all of the world's environmental problems. The impact proportional electoral systems have on environmental policy depends on the geographic distribution of competing interests, which varies across issue areas. When polluters are geographically concentrated and environmentalists are geographically diffuse, as in the case of fisheries subsidies, PR systems will tend to produce greener policies than plurality systems, all else equal. However, polluting (or extractive) industries may, in some instances, be more geographically diffuse than environmentalists. In these cases, proportional electoral systems will tend to favor the polluting (or extractive) industry.

An illustrative example comes from Sweden's forestry industry. Sweden's forestry policies broadly prioritize the economic interests of the forestry industry over the concerns of environmentalists (Appelstrand 2007; Nylund 2009). In a country with a reputation as one of the world's most environmentally progressive nations, the governments' forestry policies present something of a puzzle. However, the theory presented here helps to explain this outcome. The forestry industry enjoys oversized political influence because of its geographic diffusion and Sweden's proportional system of representation. Forests cover 70 percent of the country and the forestry industry employs almost 100,000 people across the country (about 2 percent of the total labour force) (Nylund 2009). In contrast, environmentalists are concentrated in and around the country's main population centers, such as Gothenburg and Stockholm.

The geographic diffusion of the forestry industry relative to environmentalists gives the industry comparatively greater political clout in a country where parliamentary seats are awarded to parties in proportion to their share of the vote via closed-party lists. The electoral incentives generated by the country's electoral institutions, together with the relative geographic diffusion of the forestry industry, help to explain why the Swedish Forestry Model does not quantify any environmental goals. Instead, it outlines a voluntary policy of conservation, and as a result, 37 percent of logging prioritizes production over conservation, according to a study by the Swedish Forestry Agency (Appelstrand 2007; Nylund 2009).

This example highlights an important point: Proportional electoral systems do not always produce the most environmentally friendly policies. Instead, the impact of any electoral system on environmental policy will depend on the geographic distribution of groups with a stake in the policy area. As a result, no single electoral institution can be credited with consistently producing the "best" policy outcomes with regards to the environment.

However, one consistent and important finding emerges from this study: the influence of Green political parties. A strong, positive correlation exists between Green parties' vote shares and environmentally friendly policies, holding electoral institutions constant. In countries with more electorally popular Green parties, governments spend more of their subsidy budget on environmentally friendly programs, all else equal. While intuitive, this novel finding contributes new evidence to a growing body of research on the impacts of Green political parties (e.g., Spoon, Hobolt, and De Vries 2014). It also suggests that change is possible. If Green parties grow increasingly popular with voters, governments' policies may become more environmentally friendly and international environmental cooperation may become more likely.

Supplementary Information

Supplementary information is available at the *International Studies Quarterly* data archive.

References

Aardal, Bernt. 2011. "The Norwegian Electoral System and its Political Consequences." *World Political Science* 7 (1). doi:10.2202/1935-6226.1105.

Aklin, Michaël, and Matto Mildenberger. 2020. "Prisoners of the Wrong Dilemma: Why Distributive Conflict, Not Collective Action, Characterizes the Politics of Climate Change." *Global Environmental Politics* 20(4): 4–27.

André, Audrey, Sam Depauw, and Shane Martin. 2016. "The Classification of Electoral Systems: Bringing Legislators Back in." *Electoral Studies* 42 (June): 42–53.

Appelstrand, Marie. 2007. *Miljömålet i skogsbruket-styrning och frivillighet.* PhD thesis. Lund Studies in Sociology of Law. Lund: Lund University.

Barkin, J. Samuel, Elizabeth R. DeSombre, Atsushi Ishii, and Isao Sakaguchi. 2018. "Domestic Sources of International Fisheries Diplomacy: A Framework for Analysis." *Marine Policy* 94: 256–63.

Bastiaens, Ida, and Evgeny Postnikov. 2017. "Greening up: The Effects of Environmental Standards in EU and US Trade Agreements." *Environmental Politics* 26 (5): 847–69.

Beattie, Alan. 2021 (June 8). "What Talking Fish can Tell Us About the State of the WTO." Financial Times Trade Secrets.

Bormann, Nils-Christian, and Matt Golder. 2013. "Democratic Electoral Systems Around the World, 1946–2011." *Electoral Studies* 32 (2): 360–9.

Braunerhjelm, Pontus, and Benny Borgman. 2004. "Geographical Concentration, Entrepreneurship and Regional Growth: Evidence from Regional Data in Sweden, 1975–99." *Regional Studies* 38 (8): 929–47.

Brülhart, Marius, and Rolf Traeger. 2005. "An Account of Geographic Concentration Patterns in Europe." *Regional Science and Urban Economics* 35 (6): 597–624.

Cao, Xun, Helen V. Milner, Aseem Prakash, and Hugh Ward. 2014. "Research Frontiers in Comparative and International Environmental Politics: An Introduction." *Comparative Political Studies* 47 (3): 291–308.

Carey, John M., and Matthew Soberg Shugart. 1995. "Incentives to Cultivate a Personal Vote: A Rank Ordering of Electoral Formulas." *Electoral studies* 14 (4): 417–39.

Catalinac, Amy, and Lucia Motolinia. 2021. "Why Geographically-Targeted Spending Under Closed-List Proportional Representation Favors Marginal Districts." *Electoral Studies* 71 (2): 102329.

Colgan, Jeff, Jessica F. Green, and Thomas Hale. 2021. "Asset Revaluation and the Existential Politics of Climate Change." *International Organization* 75 (2): 586–610.

Dalton, Russell J. 2005. "The Greening of the Globe? Cross-National Levels of Environmental Group Membership." *Environmental Politics* 14 (4): 441–59.

Damanaki, Maria. 2021. *Ending Harmful Fisheries Subsidies Would Improve the Health of Our Ocean. This is Why.* Cologny: World Economic Forum.

Davis, Christina. 2004. "Food Fights over Free Trade: How International Institutions Promote Agricultural Trade Liberalization." *Perspectives on Politics* 2 (3): 629–30.

Davis, Christina, and Jennifer Oh. 2007. "Repeal of the Rice Laws in Japan: The Role of International Pressure to Overcome Vested Interests." *Comparative Politics* 40 (1): 21–40.

DeSombre, Elizabeth R. 2000. *Domestic Sources of International Environmental Policy: Industry, Environmentalists, and US Power.* Cambridge, MA: MIT Press.

Evans, Carolyn L. 2009. "A Protectionist Bias in Majoritarian Politics: An Empirical Investigation." *Economics & Politics* 21 (2): 278–307.

FAO. 1993. "Marine Fisheries and the Law of the Sea: A Decade of Change." *Special chapter (revised) of The State of Food and Agriculture 1992.*

Ferejohn, John A. 1974. *Pork Barrel Politics: Rivers and Harbors Legislation, 1947–1968.* Stanford, CA: Stanford University Press.

Fiorini, Matteo, Bernard Hoekman, Petros C. Mavroidis, Douglas Nelson, and Robert Wolfe. 2021. "Stakeholder Preferences and Priorities for the Next WTO Director General." *Global Policy* 12: 13–22.

Franzen, Axel. 2003. "Environmental Attitudes in International Comparison: An Analysis of the ISSP Surveys 1993 and 2000." *Social Science Quarterly* 84 (2): 297–308.

Fredriksson, Per G., and Daniel L. Millimet. 2004. "Electoral Rules and Environmental Policy." *Economics Letters* 84 (2): 237–44.

Golden, Miriam A., and Lucio Picci. 2008. "Pork-Barrel Politics in Postwar Italy, 1953–94." *American Journal of Political Science* 52 (2): 268–89.

Gordon, H. Scott. 1954. "The Economic Theory of a Common-Property Resource: The Fishery." In *Classic Papers in Natural Resource Economics*, edited by Chennat Gopalakrishnan, 178–203. Berlin: Springer.

Gourevitch, Peter. 1978. "The Second Image Reversed: The International Sources of Domestic Politics." *International Organization* 32 (4): 881–912.

Grofman, Bernard, and Arend Lijphart. 2002. *The Evolution of Electoral and Party Systems in the Nordic Countries*. New York, NY: Algora Publishing.

Hansen, Wendy L. 1990. "The International Trade Commission and the Politics of Protectionism." *The American Political Science Review* 84 (1): 21–46.

Inglehart, Ronald F. 2008. "Changing Values Among Western Publics from 1970 to 2006." *West European Politics* 31 (1–2): 130–46.

Johnson, Joel W., and Jessica S. Wallack. 2012. "Electoral Systems and the Personal Vote." http://hdl.handle.net/1902.1/17901.

Johnson, Tana. 2015. "Information Revelation and Structural Supremacy: The World Trade Organization's Incorporation of Environmental Policy." *The Review of International Organizations* 10 (2): 207–29.

Kahn, Matthew E. 2007. "Do Greens Drive Hummers or Hybrids? Environmental Ideology as a Determinant of Consumer Choice." *Journal of Environmental Economics and Management* 54 (2): 129–45.

Kelemen, R. Daniel, and David Vogel. 2010. "Trading Places: The Role of the United States and the European Union in International Environmental Politics." *Comparative Political Studies* 43 (4): 427–56.

Keohane, Robert O. 2010. "Governing the Commons: The Evolution of Institutions for Collective Action." *Perspectives on Politics* 8 (2): 577–80.

Kiseleva, O. V., A. V. Lebedev, I. S. Pinkovetskaia, Magda J. Rojas-Bahamón, and Diego Felipe Arbeláez Campillo. 2019. "Specialization and Concentration of Small and Medium Enterprises Employees: Russian Data." *Amazonia Investiga* 8 (20): 6–15.

Lachapelle, Erick, and Matthew Paterson. 2013. "Drivers of National Climate Policy." *Climate Policy* 13 (5): 547–71.

Lundqvist, Lennart. 1980. *The Hare and the Tortoise: Clean Air Policies in the United States and Sweden*. Ann Arbor, MI: University of Michigan Press.

McGillivray, Fiona, 2004. *Privileging Industry: The Comparative Politics of Trade and Industrial Policy*. Princeton, NJ: Princeton University Press.

Mair, Peter. 2001. 'The Green Challenge and Political Competition: How Typical is the German Experience?" *German Politics* 10 (2): 99–116.

Martini, Roger. 2018. "Support to Fisheries: Levels and Impacts." OECD Report, OECD Food, Agriculture and Fisheries Papers 103.

Mazur, Allan, and Eric W. Welch. 1999. "The Geography of American Environmentalism." *Environmental Science & Policy* 2 (4–5): 389–96.

Milner, Helen V. 1997. "Industries, Governments, and the Creation of Regional Trade Blocs." *The Political Economy of Regionalism*, edited by Helen Milner and Ed Mansfield, 77–106. New York: Columbia University Press.

Natale, Fabrizio, Natacha Carvalho, Michael Harrop, Jordi Guillen, and Katia Frangoudes. 2013. "Identifying Fisheries Dependent Communities in EU Coastal Areas." *Marine Policy* 42: 245–52.

Nylund, Jan-Erik. 2009. "Forestry Legislation in Sweden." Report No 14. The Swedish University of Agricultural Sciences; Department of Forest Products.

OECD. 2017. *OECD Review of Fisheries*. Paris: OECD Publishing.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Putnam, Robert D. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization* 42 (3): 427–60.

Rae, Douglas W. 1967. *The Political Consequences of Electoral Laws*. New Haven, CT: Yale University Press.

Rickard, Stephanie J. 2012. "Welfare Versus Subsidies: Governmental Spending Decisions in an Era of Globalization." *The Journal of Politics* 74 (4): 1171–183.

———. 2018. *Spending to Win: Political Institutions, Economic Geography, and Government Subsidies*. Cambridge: Cambridge University Press.

Schrank, William E., and Ulf Wijkström. 2003. *Introducing Fisheries Subsidies*. Rome: Food and Agriculture Organization of the United Nations Rome.

Scruggs, Lyle A. 1999. "Institutions and Environmental Performance in Seventeen Western Democracies." *British Journal of Political Science* 29 (1): 1–31.

Shelburne, Robert C., and Robert W. Bednarzik. 1993. "Geographic Concentration of Trade-Sensitive Employment." *Monthly Labor Review* 116 (6): 3–13.

Skerritt, Daniel J., Robert Arthur, Naazia Ebrahim, Valérie Le Brenne, Frédéric Le Manach, Anna Schuhbauer, Sebastián Villasante, and U. Rashid Sumaila. 2020. "A 20-Year Retrospective on the Provision of Fisheries Subsidies in the European Union." *ICES Journal of Marine Science* 77 (7–8): 2741–52.

Spoon, Jae-Jae, Sara B. Hobolt, and Catherine E. De Vries. 2014. "Going Green: Explaining Issue Competition on the Environment." *European Journal of Political Research* 53 (2): 363–80.

Sumaila, U. Rashid, Naazia Ebrahim, Anna Schuhbauer, Daniel Skerritt, Yang Li, Hong Sik Kim, Tabitha Grace Mallory, Vicky W. L. Lam, and Daniel Pauly. 2019. "Updated Estimates and Analysis of Global Fisheries Subsidies." *Marine Policy* 109: 103695.

Sumaila, U.Rashid, Vicky Lam, Frédéric Le Manach, Wilf Swartz, and Daniel Pauly. 2016. "Global Fisheries Subsidies: An Updated Estimate." *Marine Policy* 69: 189–193.

Tegos, Georgios K., Kolyo Z. Onkov, and Diana V. Stoyanova. 2017. "Estimation and Analysis of Fish Catches by Category Based on Multidimensional Time Series Database on Sea Fishery in Greece." In *Proceedings of the 8th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA)*, Chania, Greece, 214–19.

Vidal, John. 2013. "One in 10 UK Adults Involved in an Environmental Group, Figures Show." The Guardian, 27. https://www.theguardian.com/environment/2013/nov/27/1-in-10-uk-adults-environmental-group

Waltz, Kenneth. 1959. *Man, the State, and War*. New York, NY: Columbia University Press.