The Politics of Green Policy: An Examination of Fisheries Subsidies

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Abstract

Protecting the environment has emerged as one of the major challenges in international relations. Some international organizations, including the United Nations and World Trade Organization (WTO), have taken up this challenge. At the WTO, negotiations over government subsidies for the fishing industry have been ongoing for 18 years. Yet, to date, negotiators failed to agree on limits to environmentally-destructive fisheries subsidies. I argue the international deadlock has its roots in domestic politics. In some maritime countries, the fishing industry enjoys substantial political influence while, in others, environmental groups have relatively more political power. The relative strength of these two interest groups depends on countries' electoral institutions and economic geography. In countries with plurality systems, fishing industries have relatively more political power because of their relative geographic concentration. In contrast, environmentalists, who tend to be more geographically diffuse, have relatively more political influence in countries with proportional electoral systems. These dynamics influence states' positions in international negotiations as well as their domestic subsidy portfolios.

Protecting the environment is a global challenge. Many environmental issues require worldwide, coordinated action. Yet, global consensus on rules to protect common pool resources is hard to achieve and few binding international environment agreements exist. In the absence of binding international rules, many countries continue to exploit global resources and purse economic goals at the expense of the environment. But not all countries. Some choose instead to voluntarily enact pro-environment, or "green", policies that aim to conserve global resources and protect the environment, despite being under no international obligation to do so.

Such behavior is puzzling in light of the dominant paradigm used to describe environmental issues: the Prisoner's Dilemma game. In a Prisoner's Dilemma game, two players are jointly better off when they both cooperate – that is, protect the environment – than when both defect. However, each player is best off when she defects while the other continues to cooperate. When a player unilaterally cooperates, they receive the "sucker's" payoff, which represents the worst possible outcome for the actor. It's easy to see why; the cooperating country agrees to forgo exploiting global common pool resources, for example, while other countries continue to exploit the resource for their own use.

The logic of the Prisoner's Dilemma game suggests that unilateral moves towards cooperation – that is, environmentally-friendly policies – will be rare. And when such moves do occur, they will likely be reversed in the face of other countries' defections. But the theoretical predictions derived from the Prisoner's Dilemma game are not uniformly borne out in empirical observations. Despite the costs entailed by the "sucker's" payoff, some countries unilaterally implement green policies. And they do

2

so even while other countries "defect" by exploiting global resources and maintaining environmentally-damaging policies. What explains this variation? Why do some countries unilaterally enact green policies while other countries' continue to exploit global common pool resources and degrade the environment?

The answer lies squarely in domestic politics. In some countries, interest groups that desire pro-environment policies enjoy significant political influence. And in some cases, these pro-environment groups enjoy more political clout than groups that oppose green policies (or groups made worse off by the "defection" of other countries). It is in precisely these countries that democratically-elected leaders are most likely to implement green policies, 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.

Groups' political influence depends on a country's electoral institutions and geography. Geographically-concentrated groups enjoy a political advantage in countries with plurality electoral systems, single-member districts and candidate centered electoral competition (e.g. Rickard 2018). In such systems, politicians win office by securing a plurality of votes in their electoral district. To achieve this goal, politicians will work to secure policies that benefit their constituents. Such policies may include government-funded subsidies or lax environmental regulations if, for example, a polluting industry is located in a politician's district.

While politicians in plurality systems work hard to secure benefits for groups concentrated in their own district, they have few incentives to cater to geographically-dispersed groups. Appealing to geographically diffuse groups neither sufficiently

rewards their efforts nor maximizes incumbent politicians' chances of reelection. Appealing to a diffuse group would be an inefficient way for a politician to "buy" the votes she needs to win office in a candidate-centered, plurality system.

Geographically-diffuse groups enjoy relatively more political influence in countries with proportional electoral rules (PR) and party-centered elections (e.g. Rickard 2018). In proportional systems, where legislative seats are awarded in accordance with parties' vote shares, every vote contributes to the allocation of legislative seats among parties. Winning the support of geographically diffuse groups enable parties to compete for votes across the country. In PR systems with multiple electoral districts, winning votes across the entire country helps parties maximize the number of seats they hold in parliament. By catering to the demands of geographically diffuse groups, parties in PR systems maximize their effective votes – that is, the votes needed to win office.

These dynamics have important implications for environmental policy. When making decisions about policies with impacts on the environment, governments face competing demands from different interest groups. On one hand, pro-environment groups typically demand policies that take the environment into account and work to protect it. On the other hand, industry groups tend to oppose policies that increase the costs of doing business, which may include policies that protect the environment. How governments resolve these competing demands depends in part on the competing groups' relative political power. When environmentalists have relatively more political powerful, governments' policy decisions will tend to be more environmentally friendly. When industry has relatively more political clout, governments' policy

decisions will tend to be less green.

I hypothesize that the relative political clout of industry, as compared to environmentalists, varies across issue areas and countries depending on countries' electoral institutions and geography. When the industry in question is more geographically concentrated than environmentalists, they will enjoy greater political influence in countries with plurality electoral systems and hence policies will be relatively less environmentally-friendly, all else equal. In contrast, environmentalists will enjoy relatively greater political influence in countries with proportional electoral systems when they are more geographically diffuse than industry. Under these conditions, government policy will be relatively more environmentally-friendly, all else equal.

I test this argument using evidence from fisheries subsidies. Fisheries subsidies refer to government assistance to the fishing industry and include, for example, grants to purchase new vessels and subsidies that reduce the operating and capital costs of fishing. Over 35 billion dollars a year go to subsidies for fishing interests around the world (Bacchus and Manak 2020). Nearly two-thirds of these subsidies harm global fish stocks by increasing the industry' capacity, which in turn leads to overfishing (Sumaila et al. 2019). Among the 1,300 commercial species of fish and marine invertebrates, 82 percent are being remove faster than they can repopulate (*Felonious fishing: The outlaw sea* 2020). Estimates suggest that over 50 percent of high seas fishing would be unprofitable without government subsidies (Sala el al. 2018).

Despite their environmental impacts, fisheries subsidies remain largely unregulated by international agreement. Fisheries subsides are not covered by the World Trade Organization's (WTO) Agreement on Subsidies and Countervailing Measures.

Cognizant of this omission, negotiators at the WTO have worked for more than 18 years to reach an agreement on fisheries subsidies. But to date, these negotiations have failed. Although there is general consensus that limiting certain types of fisheries subsidies would help to sustain fish stocks, WTO members cannot agree on restrictions on fisheries subsidies. In the absence of international restrictions, some countries subsidize fishing in ways that increase capacity and result in overfishing while others voluntarily fund "green" subsidies that help to sustain fish stocks and protect the environment.

Using novel data on "green" fisheries subsidies in 23 countries, I find that countries with proportional electoral systems and those with more successful green parties tend to spend relatively more money on "green" subsidies as a share of their total fisheries subsidy budget, all else equal. Additionally, countries with larger shares of green subsidies lead efforts at the WTO to restrict environmentally damaging subsidies. This pattern emerges from an analysis of the content of communications and draft texts regarding fisheries subsidies submitted to the WTO's Negotiating Group on Rules from 2016 to 2019. The analysis shows that structural domestic variables, including electoral institutions and economic geography, help to explain why some countries are more reluctant to agree to international restrictions on environmentally-damaging subsidies while other countries voluntarily de-fund such subsidies even in the absent of international rules.

This study aims to responds to Cao et al. (2014) who call on scholars to systemically examine the role of domestic factors in shaping environmental politics across space and time. By doing so, the current study offers micro-foundations for green

6

policy and contributes to a long tradition in international politics that acknowledges the importance of micro factors for explaining macro outcomes (e.g. Gourevitch 1978; Putnam 1988).

This study makes several additional contributions. First, it offers a novel explanation for why some countries take the lead in implementing environmentally-friendly policies while others lag behind. Previous studies have proposed the importance of domestic political institutions for environmental policy (e.g Lachapelle and Paterson 2013). However, these studies typically overlook the importance of and variation in geography. Ignoring geography would be innocuous if politicians elected via different electoral institutions are 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 groups with competing interests in environmental policy varies across both issue areas and countries. Therefore, geography must be part of any institutional explanation of environmental policy outcomes.

Second, this study compares policies rather than outcomes. Cross-national studies of environmental policy are still relatively uncommon because few measures of green policies are comparable across countries in a systematic way. Given this challenge, existing research often focuses on environmental outcomes, rather than policy (Bernauer 2013).[1] For example, many studies examine pollution emissions (e.g. Scruggs 1999). But studies of environmental outcomes often reach different conclusions than the few studies of environment policies (Bernauer 2013), which suggests

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[1]See however Lundqvist (1980).

that environmental outcomes are not perfect proxies for policies. This study proposes a novel measure of green policy using data from governments' budgets. This novel quantitative measure reflects governments' commitment to the environment in a cross-nationally comparable manner.

Third, this study has important implications for international environmental cooperation. Understanding the relative political clout of competing interest groups at home helps to explain states' positions in international negotiations. The theory developed here helps to explain, for example, the lack of success in the World Trade Organization (WTO) negotiations over fisheries subsidies. I posit that the international deadlock over fishing subsidies is rooted squarely in domestic politics. Because the maritime fishing industry has relatively more political power in some countries than others – due to countries' domestic electoral institutions and economic geography – WTO member-states' interest in restricting certain types of fisheries subsidies vary. In short, heterogeneous interests present a stumbling block to governing the global commons, just as they do for local common pool resources (Ostrom 1990; Keohane 2010).

Theory

Why do governments in some countries voluntarily limit spending on environmentally-harmful subsides in the absence of international coordination? The answer lies squarely in domestic politics. In democracies, a government's survival depends on the preferences of domestic constituencies. To retain office, governments' take into

account the preferences of key constituencies when making policy decisions. Constituencies with greater political influence will disproportionately influence policy outcomes.

Explaining political influence

The relative political influence of competing interest groups depends, in part, on countries' electoral institutions and geography. Groups of people with shared interests and policy preferences sometimes cluster together in concentrated geographic areas. Yet, groups with share interests may also be geographically dispersed throughout the entire country. Geography is often overlooked in theories of political institutions' policy impacts. Ignoring the geographic patterns of voters with shared economic interests may be innocuous if politicians elected via different institutions are equally responsive to concentrated (or diffuse) interests. But different electoral systems generate different incentives to represent geographically concentrated (or diffuse) groups. Therefore, geography must be part of any institutional explanation of policy outcomes.[2]

Geographically-concentrated groups enjoy a political advantage in countries with plurality electoral systems, single-member districts and candidate centered electoral competition (Rickard 2018). In such systems, politicians win office by securing a plurality of votes in their electoral district. To achieve this goal, politicians will

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[2]Insights regarding the interactive effects of electoral institutions and economic geography have been used to explain trade policy and industrial subsidies (Rickard 2018).

work to secure policies that benefit their constituents. Such policies may include government-funded subsidies or lax environmental regulations (if a polluting industry is located in a politician's district). While politicians in plurality systems work hard to secure benefits for groups concentrated in their own district, they have few incentives to cater to geographically-dispersed groups. Appealing to geographically diffuse groups neither sufficiently rewards their efforts nor maximizes incumbent politicians' chances of reelection. Appealing to a diffuse group would be an inefficient way for a politician to "buy" the votes she needs to win office in a candidate-centered, plurality system.

Geographically-diffuse groups enjoy relatively more political influence in countries with proportional electoral rules (PR) and party-centered elections (Rickard 2018). In proportional systems, legislative seats are awarded in accordance with parties' vote shares. Every vote contributes to the allocation of legislative seats among parties. Winning the support of geographically diffuse groups enable parties to compete for votes across the country. In PR systems with multiple electoral districts, winning votes across the entire country helps parties maximize the number of seats they hold in parliament. By catering to the demands of geographically diffuse groups, parties in PR systems maximize their effective votes – that is, the votes needed to win office.

Elections are not won district by district in PR systems (Persson and Tabellini 2004; Rogowski and Kayser 2002). In fact, no single district is critical to the electoral success of a party in PR systems (McGillivray 2004). Parties competing in PR systems are not overly concerned with votes in any given district. No individual candidate has the incentives to push the interests of a group concentrated in a single

10

district. Instead, parties will seek to win votes across multiple districts by targeting benefits to diffuse groups of voters. Given this, only weak incentives exist in PR systems to pander to geographically concentrated constituencies. Instead, parties have incentives to provide policies to geographically diffuse groups of beneficiaries, even if the beneficiaries are relatively narrow. This goal is articulated by a government minister in Norway, a country with proportional electoral rules, when he said that, "The main objective (of government policy) is to achieve value creation and economic growth in all regions of Norway." (Rickard 2018).

Although focusing exclusively on geographically concentrated groups may increase a party's vote share in a given district, it limits the national appeal of a party and consequently the number of legislative seats a party could win. In Norway, for example, a party called People's Action Future for Finnmark (Folkeaksjonen Framtid for Finnmark) focused entirely on improving economic conditions for the fishing industry in Finnmark. It subsequently won 21.5 percent of the vote in the district in 1989 (Aardal 2011). However, the party 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 national threshold of 4 percent.

As this example illustrates, responding to the demands of geographically concentrated groups can limit parties' national appeal and consequently their share of the national vote. This is consequential for parties competing in PR systems. In many PR systems, thresholds stipulate a minimum share of the national vote that parties must win in order to hold any seats in parliament. To clear the threshold, parties cannot focus their attention on geographically concentrated groups. Instead, parties

competing in PR systems have powerful incentives to pursue votes across the entire country and will work to assist geographically diffuse groups.

These dynamics have important implications for environmental policy. When making decisions about policies with impacts on the environment, governments face competing demands from different interest. On one hand, environmental groups typically demand policies that take into greater account the environment and do more to protect it. On the other hand, industry groups tend to oppose policies that would increase the costs of doing business, which may include policies that protect the environment. How governments resolve these competing demands depends in part on the groups' relative political power. When environmentalists have relatively more political powerful, governments' policy decisions will tend to be more environmentally friendly. When industry has relatively more political clout, governments' policy decisions will tend to be less "green".

Table 1 lays out the conditions under which environmentalists (or industry) enjoy relatively more political influence. Assuming two key actors (industry and environmentalists), there are four possible geographic patterns; two of which produce situations where the competing interest groups have relatively similar levels of political power. When both industry and environmentalists are equally diffuse or equally concentrated geographically, their political influence will be broadly similar. These scenarios do not generate clear policy predictions.

However, clear predictions emerge from the two other boxes. If environmentalists are relatively more geographically concentrated as compared to industry, they will have greater political power in plurality systems and relatively less political power

12

		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

in PR systems, all else equal. These conditions are reflected in the upper right-hand box.

The lower left-hand box represents a situation where environmentalists are relatively more geographically diffuse and industry is more geographically concentrated. In this scenario, industry will have relatively greater political influence in plurality systems and policy outcomes will better reflect their demands. Under these conditions, environmentalists will have relatively greater political influence in PR systems. These conditions describe the politics surrounding fisheries subsidies.

Geography

Because the fishing industry uses a natural resource that is located only in certain areas, the industry tend to be geographically concentrated in virtually all countries. In Norway, for example, half of the industry's labor force lives in just three electoral districts: Finnmark, Nordland and Møre og Romsdal (Fløysand and Jakobsen 1999 quoted in Rickard 2018). In fact, the fishing industry is twice as concentrated geographically as agriculture or manufacturing (Rickard 2018).

Because of the fishing industry's geographic concentration, it enjoys greater po-

litical clout in countries with plurality electoral systems and candidate centered electoral competition. Politicians representing coastal areas where the fishing industry tends to be concentrated work to supply beneficial policies to the industry, including generous subsidies. 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 (Ferejohn 1974; Fenno 1978; Wilson 1986). While the economic benefits of such a subsidy are concentrated in a politician's electoral district, the costs are dispersed across the country.

In the United Kingdom, for example, members of parliament (MPs) that represent coastal constituencies and constituencies with large numbers of people employed in the fishing industry often lobby for government subsidies for the fishing industry. For instance, Sue Hayman, an MP from the costal constituency of Workington in the north-west of Cumbria asked the government for subsidies for fishing industry. In the House of Commons, she asked, "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?" (Source: 04 July 2018, Volume 644, Hansard). Similarly, Scott Mann, an MP from the costal constituency of North Cornwall asked the government for "support for fishing communities" (Source: 19 October 2016, Volume 615).

While these MPs come from different political parties, they both represent constituencies where the fishing industry is concentrated and consequently has a large

14

presence. To win re-election, these politicians need the support of their geographically-defined constituents. They therefore work to secure subsidies for the fishing industry in an effort to secure the industry's support at the next election. In Canada, for example, politicians from coastal constituencies opposed cuts to the Fishing Vessel Assistance Programme (FVAP). This program was introduced during the Second World War and paid bounties to enterprises that purchased fishing vessels. When the government tried to reduce spending on the subsidy, they faced stiff opposition for the industry which argued that a reduction in the subsidy would weaken the sector and the coastal economies in which the sector was concentrated (FAO 2003). Politicians from coastal constituencies fought the cuts.

Environmentalists tend to be more geographically diffuse than the fishing industry. Environmentalists tend to be dispersed across areas with in countries. In the United Kingdom, for example, one in 10 adults is a member or supporter of Britain's environment and conservation groups and these people were dispersed across the entire country (Vidal 2013).[3]

Because environmentalists are relatively more geographically diffuse than the fishing industry, they tend to enjoy relatively more political influence in countries

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[3]Although environmentalists tend to be geographically diffuse, their numbers may be "lumpy" – that is, there may be more environmentalists in some areas than others. In the United States, for example, California is the state with the highest count 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 50 US states and the District of Columbia.

with proportional electoral rules (PR) and party-centered elections. This is true for at 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. To maximize their effective votes and consequently the number of legislative seats they hold, parties in PR systems will work to assist geographically diffuse groups (Rickard 2018).

Second, electoral systems influence party systems. The connection between electoral systems and the number of political parties is widely viewed as one of the most durable and reliable hypotheses in political science (Taagepera and Shugart 1993). By providing structural constraints, electoral systems influence how many parties will attempt to compete for seats in the legislature (Blais and Carty 1987; Blais and Carty 1991; Rae 1967; Benoit 2001). Plurality elections tend to constrain the number of parties operating in a country to a greater extent than multi-member proportional elections (Grofman and Lijphart 2002). Proportional representation incentivize the emergence of small parties, including green parties. Environmental activists became involved in electoral politics in European countries with proportional electoral rules (PR) as early as the 1980s (Kelemen and Vogel 2010). In a number of PR countries, green parties emerged as a political force and raised the profile of environmental issues in national political debates (Mair 2001). Green parties have became increasingly mainstream in countries with proportional electoral rules (Kelemen and Vogel 2010).

Green parties push governments to adopt environmentally friendly policies. Even if a green party is not in government, it can influence government policy by politi-

cizing the environment as a new political issue (Spoon, Hobolt, and De Vries 2014). However, if there is no green party in a country, pro-environment stances will be less well represented in the policy-making process.

In sum, geographically-diffuse environmentalists enjoy relatively greater political clout in PR systems when facing off against geographically-concentrated fishing industries. This is because proportional electoral systems provide party leaders and politicians with incentives to respond to the interests of geographically-diffuse environmentalists. Additionally, PR systems incentivize the emergence of smaller parties, such as green parties, that will champion pro-environmental policies. Because of their political clout, the interests of environmentalists will be better reflected in policy outcomes than the interests of the fishing industry. What exactly are their interests when it comes to fisheries subsidies?

Interests

The interests of fishers and environmentalists are not always in opposition. Indeed, much of the fishing industry recognizes the importance of maintaining sustainable fish stocks and keeping the oceans clean.[4] However, two groups' preferences diverge over the issue of subsidies.

Government-funded subsidies for the fishing industry are generous; total subsidies

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[4]While fishing industry is certainly aware of and attuned to environmental issues, they often view environmental concerns as orthogonal to their economic interests, particularly in the short to medium term. See, for example, Worrall (2019) and Worrall (2020).

to the industry amount to 35 billion dollars annually, or approximately 30 to 40 percent of the value of all fish landed by marine vessels worldwide (Bacchus and Manak 2020). Two-thirds of these subsidies increase fishing capacity and made possible fishing beyond environmentally sustainable limits (Sumaila et al. 2019). Over 50 percent of high seas fishing would be unprofitable at its current scale without government subsidies (Sala el al. 2018). In addition to their environmental impacts, fishing subsidies also have implications for food security. Subsidies that engender overfishing reduce the availability of inexpensive animal protein to populations in developing countries that are least likely to be able to afford alternative sources of protein (FAO 2003).

Environmentalists oppose fisheries subsidies that generate over-capacity and over-fishing. Such programs include subsidies to construct and purchase new vessels, to buy, transport, or store fishing equipment, and 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 lured others to enter the local fishery, which undermined the sustainability of the fish stocks (Berkes 1986b p 79; Ostrom 1990). In Canada, the federal government offered substantial subsidies for the purchase of ground fish gill nets (Ostrom 1990). The use of these nets negatively affect fish stocks. Reducing and/or eliminating these types of environmentally-destructive subsidies is the aim of environmental groups around the world. More than 160 environmental groups, including the World Wildlife Fund and Greenpeace, signed a

18

petition urging an end to harmful fishing subsidies (Pew Trusts 2020).

Fishing industries typically lobby for subsidies because in the short-term, subsidies produce additional profits for fishers (FAO Fisheries Department 1992, p. 22). Subsidies that reduce the costs of inputs such as gear, bait and ice provide a direct economic benefit to fishers by reducing the costs of doing business. Subsidies that reduce the costs of doing business may subsequently encourage over-capacity and over-fishing. Fishers suffer from over-fishing in the longer-term. But the costs of over-fishing are delayed while the economic benefits from the catch today are immediate. Each fisher is therefore motivated to catch more because he receives the direct benefit of his own catch and bears only a share of the costs resulting from overfishing. 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, p. 124). In this way, fish stocks present a classic tragedy of the commons situation. No one person owns the commons, each individual has an incentive to utilize common resources as much as possible. Without governmental involvement, the commons is overused. And in this case, governmental involvement via subsidies actually increases the overuse and exploitation of the commons by reducing the costs of "using" the commons.

Fishers therefore seek to maximize their catch and aim to do so at the lowest cost. To achieve this goal, fishers lobby the government for subsidies that offset or lower the costs of doing business, including fuel subsidies and grants for nets or boats. In Scotland, for example, the Scottish Fishermen's Federation engages with the Scottish Government to demand increases in financial support for the industry (Evening express 2020). In England, the National Federation of Fishermen's Organisations

(NFFO) pressures the Government for financial support. The organization sends briefing notes to coastal MPs and government ministers and urges them to assist the industry. In Canada, the Maritime Fishermen's Union (MFU) and the Fish, Food and Allied Workers (FFAW) lobby the federal government for financial assistance for the fishery industry. The industry explicitly opposes cuts to subsidies arguing that reducing fisheries subsidies would weaken the sector (FAO 2003).

Governments subsequently find themselves facing competing demands when it comes to fisheries subsidies. Whose demands prevail? I propose that in proportional systems, the demands of environmentalist are more likely to prevail than those of the fishing industry. As a result, the governments' portfolio of fishing subsidies will include a larger share of environmentally-friendly programs in proportional systems, as compared to plurality systems, all else equal. I empirically test this hypothesis below.

Examining Fisheries Subsidies

When providing subsidies to the fishing industry, governments can do so in more or less environmentally-friendly ways. Different types of fisheries subsidies have varied environmental impacts, as demonstrated by a large body of research from ecologists and marine scientists (e.g. Sumaila et al. 2016). I draw on this body of research to estimate the share of green, environmentally-friendly subsidies in a country's portfolio of fisheries subsidies. Data on fishing subsidies come from the OECD's Fisheries Support Estimate (FSE) database, which reports information on

budgetary transfers to fisheries. The sample includes 23 non-landlocked, democratic countries.

To estimate the share of green subsidies in a country's fisheries subsidies portfolio, I calculate the percent of general services fisheries subsidies spent on the sum total of subsidies for the management of fish resources and subsidies allocated to research and development.[5] Ecologists and marine scientists agree that research and development subsidies and subsidies for the management of fish resources have unambiguously positive impacts on fish stocks (Sumaila et al. 2016). Fish management subsidies fund, in part, scientific research that investigates when fish stocks are stable or declining. Subsidies also go to monitor and oversee fishing stocks and ensure there is no overfishing (OECD 2017, Sumaila et al. 2016).

Figure 1 illustrates the cross-national variation in green subsidy shares, averaged over the period from 2008 to 2018. As Figure 1 demonstrates, some countries spend more of their fisheries subsidies on green programs than others. In Norway, for example, fisheries subsidies are relatively green (FAO 2003). Norway fully subsidizes the cost of fisheries management and does not attempt to recover any of the costs from the industry. Additionally, the Norwegian government funds a vessel buy-back program specifically designed to reduce overcapacity (FAO 2003). In contrast,

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[5]General services refers on services provided to fisheries generally rather than individually. General services provide support addressed to the whole sector. Government spending on general services has been increasing since 2009 and now makes of the bulk of fishing subsidies. As a result, support for the fishing industry is predominantly supplied in the form of general services by all countries (OECD 2017).

Greece spends less than 10 percent of its subsidy budget on environmentally-friendly subsidies.

Figure 1: Share of Green Fisheries Subsidies
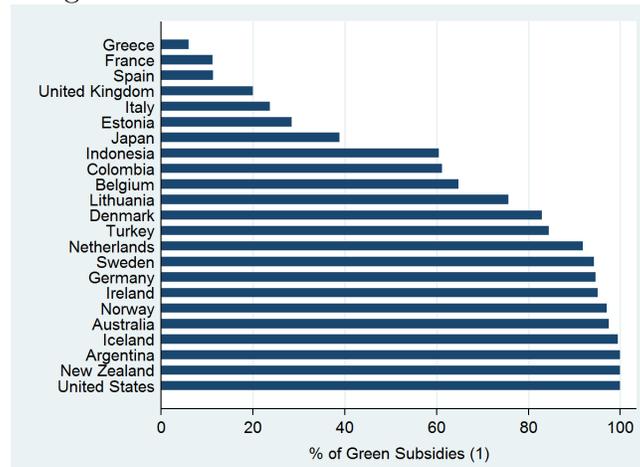
Key explanatory variables

To identify countries' electoral system, I use data from Bormann and Golder (2013). I focus on the electoral system used in national-level (lower house) legislative elections. I code countries' electoral systems in the same year or closest previous year to the subsidy year. I use a categorical variable (legislativetype) that takes one of three possible values to indicate the type of electoral system used in lower house legislative elections: 1) Plurality ; 2) Proportional; and 3) Mixed. Theoretically, I am most interested in the distinction between plurality and proportional systems.

Data on green parties' vote shares come from various sources, including the Parl-Gov database. For countries not included in the ParlGov database, I referred to the countries' own online electoral records. Uses these data, I construct a variable

(green) that equals the share of the vote won by green parties in national lower house legislative elections. I include the green parties' vote share in the same year or closest previous year to the subsidy year. As a conservative estimate of public support for the environment, I focus exclusively on green parties's vote shares here – although other parties may, of course, be pro-environment. I exclude green parties that run for office in coalitions with other parties including, for example, Portugal's Ecologist Party The Greens (Partido Ecologista "Os Verdes" PEV). In elections, the PEV is closely allied with the Portuguese Communist Party, in the Unitary Democratic Coalition (UDC). It is not possible to uncover The Green's individual vote share separate from the UDC's vote share. Typically green parties that receive less that 1 percent of the vote share are not included in my measure because the data available for such parties is variable and often missing. A full list of the green parties can be found in the Appendix.

Control variables

Given the relatively small sample size, I am judicious with the control variables. First, I control for countries' per capita income. Increases in countries' wealth may encourage the spread of post-materialist values, which inspire greater public support for environmental protection (Kelemen and Vogel 2010; Scruggs 2003; Franzen 2003). As countries become richer, citizens may prioritize sustainability over other issues.

Second, I control for the size of a country's fishing industry. Governments in countries with larger fishing industries may come under greater pressure to support

23

the industry.[6] However, the effect of industry size is not entirely clear ex-ante. In Iceland, for example, where the fishing industry is large, total fisheries subsidies have been substantially smaller than in other countries with smaller fishing industries (FAO 2003). This observation looks somewhat perverse from a political perspective. However, the reason for the relatively low level of fisheries subsidies in Iceland is the fishing industry's dominance of the country's economy. Since World War II, there have been no other industries large enough, with sufficient financial surplus, to provide sources of funds with which to finance the Icelandic fisheries. Given the industry's sheer size, Icelandic fisheries have largely had to stand largely on their own financially (FAO 2003).

I also introduce two additional control variables. First, I include a dummy variable coded 1 for EU member states and zero otherwise. This is a potentially important control variable because EU Member States support is heavily influenced in scope and volume by EU structural support (EFF, EMFF) (OECD 2017). The European Maritime and Fisheries Fund (EMFF) Fund is used to co-finance fishing-related projects, along with national funding. Each country is allocated a share of the total Fund budget, based on the size of its fishing industry. Each country then draws up an operational program, saying how it intends to spend the money. Once the Commission approves this program, it is up to the national authorities to decide which projects will be funded. However, EU regulations explicitly state that the

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[6]Subsidies may keep more people working in fishing. Given this, the direction of causality is difficult to establish. However, I lag the measure of industry size by one year in an attempt to estimate the effect of industry size on government subsidies.

granting of public monies should not lead to an increase in fishing effort.

Because many EU member states have proportional electoral systems, EU membership could be a confounding variable and therefore is an important control. However, the key results remain robust to the inclusion of the EU variable. The EU variable is negatively correlated with spending on fish subsidies, which is consistent with the idea that the EU is a global environmental leader (Kelemen and Vogel 2010).

Second, I include the lagged natural log of population as a control variable. The inclusion of this variable introduces some multicollinearity. However, it may be an important control because more populous countries have more consumers. More populous countries also tend to spend significant amounts of money on agriculture subsidies. Additionally, country size tends to be correlated with electoral systems. However, the key results remain robust to the inclusion of population.

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. Using the most conservative estimate, I calculate that moving from a plurality system to a proportional system increases the share of environmentally-friendly subsides in a government's portfolio of fish subsidies by 20 percentage points. This result is robust to the inclusion of total population, total GDP and EU membership. This result comes from models that control for green parties' vote share. This implies that a country's electoral system influences green policies independent

Table 1: Estimated effect on % Green Subsidies (measure 1)

	(1)	(2)	(3)	(4)	(5)
PR system	18.702**	20.145**	20.645***	20.575***	19.398**
	(9.067)	(8.430)	(6.115)	(7.869)	(8.065)
Mixed system	27.249**	27.738***	31.126***	31.027***	29.479**
	(11.041)	(10.032)	(8.805)	(11.701)	(11.429)
Green party vote share		2.031***	1.249***	1.244**	1.165**
		(0.390)	(0.360)	(0.530)	(0.473)
GDP per capita, thousands (lag)	0.474***	0.371***	0.484***	0.484***	0.493***
	(0.100)	(0.108)	(0.103)	(0.131)	(0.093)
Boats, thousands (lag)	-0.026	-0.014	-0.039	-0.039	-0.037
	(0.024)	(0.020)	(0.027)	(0.027)	(0.026)
EU member			-26.418***	-26.413***	-26.176***
			(4.851)	(4.831)	(4.889)
Population (nl) (lag)				-0.037	
				(2.756)	
GDP (nl) (lag)					-0.599
					(2.609)
Constant	35.681***	30.024***	42.143***	42.853	59.158
	(9.857)	(9.862)	(8.189)	(55.762)	(76.376)
Observations	136	136	136	136	136
R-squared	0.128	0.217	0.352	0.352	0.352

of its effect on the party system. These results are consistent with findings from Fredriksson and Millimet (2004) who report that countries with proportional electoral systems have stricter environmental policies than countries with majoritarian systems, all else equal.

Green parties' vote shares are positively correlated with green subsidies shares, across all models. When green political parties win a larger share of votes in legislative elections, governments spend more of their fishing subsidies on environmentally-

beneficial programs. Green parties' vote shares robustly predict the share of environmentally-beneficial programs in a governments' fish subsidy portfolio. On average, a one percentage point increase in green parties' vote share corresponds with a one percentage point increase in the share of environmentally beneficial fish subsidies. Using the most conservative estimate, I calculate that an increase in green party vote share by one standard deviation (5.13 percent) results in a 6.4 percentage point increase in the share of the total subsidy budget for the fishing industry allocated to green subsidies. The magnitude of the estimated effect varies across models and in some, is significantly larger than conservative estimate calculated here.

As a robustness check, I re-estimate all models using the share of general service subsidies devoted exclusively to research and development. While researchers agree that subsidies for research and development and management subsidies contribute least to overcapacity and overfishing (OECD 2017), some argue that subsidies for research and development come closest to public goods. Because their incidence is at some distance from production activity, research and development subsidies may have a lesser impact on fishing effort than even management subsidies (OECD 2017). Strikingly similar results emerge using this alternative measure of green subsidies, as reported in Table 2.

Two other results deserve mention. First, richer countries, as measured by GDP per capita, spend a larger share of their total subsidy budget for the fishing industry on green subsidies, all else equal. An increase in GDP per capita of one standard-deviation (21,218 USD) raises the share of environmentally-friendly subsidies by 10 percentage points.

Table 2: Estimated effect on % Green Subsidies (measure 2)

	(1)	(2)	(3)	(4)	(5)
PR system	12.019***	12.633***	12.625***	10.992***	9.957***
	(3.711)	(3.001)	(2.213)	(3.646)	(3.508)
Mixed system	13.275***	13.287***	15.154***	12.781**	11.558**
	(4.470)	(3.827)	(3.231)	(5.305)	(4.744)
Green party vote share		1.316***	0.847***	0.708**	0.662**
		(0.245)	(0.244)	(0.357)	(0.313)
GDP per capita, thousands (lag)	0.077	0.006	0.078	0.063	0.096
	(0.091)	(0.095)	(0.077)	(0.083)	(0.078)
Boats, thousands (lag)	-0.035***	-0.027***	-0.043***	-0.039***	-0.038***
	(0.008)	(0.007)	(0.011)	(0.012)	(0.010)
EU member			-16.103***	-15.925***	-15.496***
			(3.180)	(3.178)	(3.190)
Population (nl) (lag)				-0.897	
				(1.705)	
GDP (nl) (lag)					-1.337
					(1.478)
Constant	13.152**	9.979*	17.778***	35.030	55.681
	(5.161)	(5.192)	(5.826)	(33.548)	(42.603)
Observations	144	144	144	144	144
R-squared	0.078	0.174	0.305	0.307	0.310

Second, the size of the fishing industry is inversely correlated with the share of environmentally-friendly subsidies. Countries with larger fishing industries spend less of their total subsidy budget for the fishing industry on green subsidies (although these results do not always reach conventional levels of statistical significance).[7] Although the size of the fishing industry is lagged, it remains possible that the size of the industry is endogenous to subsidies. With these caveats in mind and using the most conservative estimate, I calculate that an increase in the size of the fishing industry by one standard deviation (73,811 boats) reduces the share of green subsidies in a government's fish subsidy portfolio by 11.8 percentage points.

International implications

The politics of green subsidies have important implications for international relations. Sustaining global fish stocks requires coordinate international action. Yet, such action is rare. Members of the WTO have negotiated over rules regulating fisheries subsidies for more than 18 years. These negotiations have failed to reach an agreement on international restrictions on fisheries subsidies. The international deadlock is rooted in domestic politics. The same domestic structural factors that lead some countries to fewer green subsidies also help to explain why some countries resist international restrictions on capacity-enhancing subsidies.

In a country where the government spends relatively more money on green sub-

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[7]The limited degrees of freedom inflates standard errors and biases against finding statistically significant relationships.

sidies, domestic fishers will tend to support comparable international standards in order to create a level playing field (Kelemen and Vogel 2010). Fishers who receive no government subsidies for fuel or gear, for example, do not want to compete against fishers from other countries whose fuel and gear are generously subsidized because doing so puts them at a disadvantage. Therefore, fishers in countries with few capacity-enhancing subsidies will support international restrictions on such subsidies to help ensure a more level playing field. When domestic subsidies are greener, fishers are less likely to oppose international restrictions on fisheries subsidies and may, in fact, join with environmentalists to advocate for them. In contrast, when domestic funding for capacity-enhancing subsidies is generous, fishers are more likely to oppose new international restrictions on such subsidies.

This logic explain why countries' domestic subsidy portfolios will generally align with their position in international negotiations over fisheries subsidies. I demonstrate such a pattern via a content analysis of communications and draft texts submitted to the WTO's Negotiating Group on Rules from January 2016 to December 2019. The key findings are reported below.

First, countries with the largest shares of green domestic subsidies tend to propose the toughest international restrictions on capacity-enhancing subsidies. For example, New Zealand is a leading champion of international restrictions on fisheries subsidies at the WTO. In the past, New Zealand undertook extensive domestic reform to their own fishing subsidies in order to reduce overfishing and now the country's subsidies are overwhelming green (FAO 2003). No budgetary transfers go directly to individual fishers (OECD 2017) and 100 percent of its general subsidies go to

environmentally-friendly programs. Given its domestic subsidy portfolio, it is no surprise that New Zealand champions international restrictions on fisheries subsidies at the WTO. In 2017, New Zealand (along with Iceland, who also spends 100 percent of its fisheries subsidies on green programs, and Pakistan) submitted one of the most ambitious proposals on fisheries subsidies to the WTO. In it, New Zealand called for restrictions on subsidies that lead to overfishing as well as illegal, unreported and unregulated (IUU) fishing. New Zealand also proposed that all fisheries subsidies be notified to the WTO and opposed any special and differential treatment for less developed countries (WTO 2017).

Like New Zealand, Australia voluntarily reduced its spending on subsidies that have a negative effect on fish populations (FAO 2003). Australia also encouraged boats to adopt on-board cameras that start recording when, for instance, a winch drum turns or a seine net is shot in an effort to prevent illegal activities, such as skippers catching more fish than they have a permit for, or misreporting the species they caught (*Felonious fishing: The outlaw sea* 2020). Given Australia's domestic commitment to environmentally-sustainable fishing, it is perhaps no surprise that it has pushed hard for WTO restrictions on fisheries subsidies. In 2019 alone, Australia submitted 4 proposals to the WTO's Negotiating Group on Rules. In one, Australia joined together with the United States to propose restrictions on subsidies that support IUU fishing and/or lead to overfishing.

Second, countries that spend large shares of their own subsidy budgets on fisheries management tend to back exceptions that would allow subsidies for fisheries management under international rules. For example, the United States spends 89 percent of

its general support for the industry on subsidies for fisheries management. In its 2019 submissions to the WTO, the US makes it clear that it wants fisheries management subsidies to be excluded from any caps agreed on total subsidy spending. Australia spends 60 percent of its general support for the industry on management subsidies; it joined with the US to call for management subsidies to be permitted under WTO rules (if management measures are shown to be effective) and excluded from any caps on total subsidy spending.

Third, countries that spend relatively less on green subsidies tend to put up greater resistance to international restrictions. For example, Chile spent 78 percent of their total transfers on subsidies for the purchase of inputs, such as fuel or gear over the past 10 years, on average. These types of subsidies enhance the capacity of fishers, which may lead to overfishing. Chile refused to join their neighbours Argentina and Peru in supporting international restrictions on capacity enhancing subsidies.

Indonesia spends 100 percent of their total transfers on subsidies for the purchase of inputs, which typically increase capacity. Indonesia proposed that developing countries should be exempt from international restrictions on capacity enhancing subsidies (WTO 2017). Specifically, Indonesia proposed that its own subsidies should be allowed. Similarly, China also proposed curbing others' subsidies while protecting its own (*Felonious fishing: The outlaw sea* 2020). In sum, countries' positions in international subsidy negotiations reflect their domestic spending priorities, which are themselves shaped by structural domestic variables.

Countries intransigence in international negotiations over fisheries subsidies is un-

surprising given that their positions are, in part, an outcome of competing demands by interest groups whose relatively political clout depends on countries' electoral institutions and geography. These structural domestic variables change only infrequently over time. As a result, countries' positions in international negotiations will tend to be relatively static. As the Chair of the WTO's Negotiating Group on Rules (RNG) described the fisheries talks, "Members are still holding on to their well-known positions, even at this late stage. Members....have held on to them for several years" (WTO 2019). However, change is possible. As I report above, green parties' vote shares are positively correlated with governments' spending on environmentally friendly subsidies and countries' subsidy portfolios generally align with their position in international negotiations over fisheries subsidies. If more and more people cast their vote for green political parties, countries' may become more willing to cooperate on fisheries subsidies.

At the moment, however, heterogeneous interests appear to be a significant stumbling block in governing the global commons, just as they are for local common pool resources (Ostrom 1990). This suggests that at least some of the insights from investigations of local common pool resources may help to illuminate conflict and cooperation over global common pool resources, such as global fish stocks (Keohane 2010). This suggests a potentially fruitful avenue for future research on global environmental cooperation.

Conclusion

The extent to which a country's policies are environmentally-friendly depends, in part, on the relative political influence of environmentalists as compared to groups that oppose green policies, such as extractive industries or polluters. I argue that the relative political influence of key interest groups in environmental policy depends on countries' electoral institutions and geography. Using a novel measure of governments' policy commitment to the environment, I find that policy outcomes are greener in countries with proportional electoral systems when environmentalists are more geographically diffuse than the industry in question. In countries with plurality electoral rules, industry's interests tend to be better reflected in policy outcomes when the industry is relatively geographically concentrated, as compared to environmentalists.

This study suggests several potentially fruitful avenues for further research. First, future studies may productively explore the policy implications of the upper right-hand box of the two-by-two diagram. This box proposes policy outcomes in situations where environmentalists are relatively more geographically concentrated than industry groups. Polluting industries may, in some instances, be more geographically diffuse than environmentalists. For example, agricultural producers that use fertilizer and/or pesticides may, in some countries, be more geographically diffuse than environmentalists. In this case, the theory generates different implications for governments' policy decisions and these predictions could be subject to empirical scrutiny in future studies.

Second, future research is needed to investigate the cases where electoral systems

and geography together generate inconclusive implications for politics and policy. These instances correspond to the two boxes in Table 1 where competing interest groups have relatively similar levels of political influence because of their similar patterns of geographic dispersion. In these cases, future research may usefully illustrate other factors that tip the balance of power in favor of one group or the other.

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