

**EXAMINING THE IMPACT OF INSTITUTIONS ON  
COMMON POOL RESOURCE PROBLEMS:  
THE EU AND ITS INABILITY TO STOP OVERFISHING**

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According to a recent report published in the journal *Science*, there will be no species of fish living at a commercially viable level in the world's oceans by the year 2048. The culprit is the practice of overfishing, whereby fleets take more fish out of the sea than fish are born each year (Smith 2006). Overfishing is an excellent example of a particular type of collective action problem, sometimes known as the "Tragedy of the Commons," (Hardin 1968) or the common pool resource problem. When there is a common pool resource without regulation, the incentive for individuals (or states) is to take as much as possible before it runs out. As evidence of this, the supply of Atlantic fish such as cod and haddock has dropped sharply in some areas, and has even collapsed off the coast of Canada. The European Union has attempted to solve the problem of its members' shared fisheries with a system of quotas under the Common Fisheries Policy, which has been in place since 1983. Under this policy, each EU member state is given a quota for the number of fish its fleets may catch in a given area. These quotas are determined through intergovernmental bargaining. (Lequesne 2000)

However, there is consistent evidence that most of the EU member states regularly break their quotas; they overfish at varying levels. What explains this variation in the level of overfishing among EU member states? Little to no work has been done in this area in political science. Bailey (1996) discusses global efforts to conserve fish stocks, and notes that these efforts are taking on ever more importance as marine catches began to fall substantially in the early 1990s due to overfishing. Franchino and Rahming (2003) also look at why CFP quotas are inefficient biologically (they contribute to the continued drop in fish stocks), and find that fisheries ministers are less concerned with

environmental protection than their governments' stated policy. But no work has been done on causes of varying levels of overfishing.

I propose that electoral rules which add political parties to the decisionmaking process will result in greater amounts of overfishing among member states of the European Union; as parties compete for ever-smaller pieces of the electoral pie, smaller and smaller blocks of votes become important, and governing parties will be more inclined to look the other way when fishermen wish to overfish, simply paying the penalty in Brussels.

### **History of the CFP**

Oceanic fish stocks are a classic example of the common pool resource problem. When there is unrestricted access to a common pool resource, each user will consume the resource and subtract from the quantity available to others to an extent which eventually produces diminishing returns to all users and in some cases the exhaustion of the resource (Ostrom 2000). In the case of fish, this means ecological collapse of the stock, as has already happened with North Atlantic cod.

The Treaty of Rome (1957) put fisheries products under the same heading as agricultural products, and a separate Common Fisheries Policy was put into place in 1970 at the behest of France which included structural aid to modernize the fishing industry and free access for fishing vessels into the territorial waters of other member states.<sup>1</sup> A separate regulation was adopted in 1983 adding the conservation and management of fisheries to the CFP, and this plank has received the greatest focus in the succeeding two

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<sup>1</sup> This provision is one of the reasons Norway voted against accession to the EU in 1972.

decades.<sup>2</sup> At that time, TACs (total allowable catches) and quotas came into existence. The European Council first instituted specific limits on catches and licenses in December 1992. (Lequesne 2000) Responding to the continued erosion of fish stocks in EU waters, reforms were initiated in 2002 to increase stakeholder involvement and transparency. (Gray and Hatchard 2003) The Directorate-General for Fisheries (DG XIV) is in charge of the CFP.

Today, the fisheries sector is admittedly one of the smaller components of the European economy. Just over 270,000 people were employed in the EU-15 in the fishing and fisheries industries in 1995, and the number has dropped since then (it has of course gone up since the addition of the 10 Central and Eastern European countries and the fishing fleets of Poland, Estonia, Latvia, and Lithuania in particular); moreover, the value of fish catches is less than 1 percent of gross domestic product in all member states. But fishing remains important for historical and cultural reasons; fish makes up a large part of the diet for meat in many European nations, and the traditional image of the fisherman powerfully hearkens back to previous maritime exploits in a nation's past for many. And empirical work on the EU Council of Ministers has shown that fisheries are one of the more contested areas in council negotiations, second only to agriculture in 1993-1994 and third to agriculture and internal market issues from 1998 to 2004. (Hayes-Renshaw et al. 2006)

The Council of Fisheries Ministries has direct control over fishing regulation in the EU and can issue regulations (instead of directives, which must be implemented by member state governments). The European Parliament only has the right to be consulted

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<sup>2</sup> Many of the EU's fisheries regulations since the 1970s have been at least in part responses to the United Nations Convention on the Law of the Sea (see Bailey 1996).

on fisheries issues, and is largely shut out of the policy process. The European Commission has the ability to take offending states to the European Court of Justice and impose penalties for overfishing, which happens on a regular basis. (Lequesne 2000)

The current quota system covers some 120 fish stocks in the North Sea, Baltic Sea, and Atlantic Ocean (a TAC for bluefin tuna has been established in the Mediterranean Sea, but the Mediterranean is not zoned). Each year's total allowable catch is set in December; as a whole, TACs have increased about 30 percent since 1985 (Franchino and Rahming 2003).<sup>3</sup> The quota system is implemented at the national level in different ways: the UK leaves TAC management to producer organizations, France allocates quotas to producer organizations by geographical criteria and those organizations then manage the TAC, while the Netherlands uses a system of individual transferable quotas (similar to the system proposed for greenhouse gas emissions), making total allowable catch a property right. None of these implementation techniques, however, have affected overfishing noticeably; all three countries overfish, in varying amounts.

Overfishing is probably worse than makes it onto the EU books; illegal landings and "black fish" are known to occur. EU inspectors must be accompanied by national authorities, and cannot undertake independent inspections; in addition, national inspectorates rarely cooperate, and have not formed a transnational network. And national inspectorates are more likely to catch and fine a non-national caught in their waters than a national; one reason given for Spain's consistent overfishing performance is

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<sup>3</sup> In addition to the TAC and quota systems, the EU also attempts to restrict fishing by limiting time fleets can spend at sea, controlling the holding capacity of fleets, setting minimum allowable sizes for species, and regulating fishing gear (Daw and Gray 2005)

that Spanish deep-sea fishermen are quite active in other EU member states' territorial seas.

### **Literature on Fisheries and the CFP**

Thinking about fisheries in social science terms goes back at least to Gordon (1954). The open-seas fishery is a special case of the common pool resource problem; unlike the village commons in the traditional "Tragedy of the Commons" metaphor, the ocean cannot be fenced off. Property rights are difficult to enforce.

Lequesne (2000) notes that there is very little on the Common Fisheries Policy (in English or French, at least) in the academic literature, although a comparatively large number of interest groups take part in policymaking, from biologists and economists to representatives of the fishing industry and governments. A rising number of cases at the European Court of Justice concern CFP violations. Franchino (2005) cites fisheries policy as one of the major understudied areas in the European Union, along with public procurement.

Franchino and Rahming (2003) focus their study on explaining why the Council on Fisheries regularly passes inefficient (in terms of preserving the fish stocks) TACs and quotas unanimously, something the literature on coalition behavior would not predict. They find that because the Fisheries Council is composed of members with policy preferences biased in favor of the fishing industry, they produce inefficient decisions and then impose constraints on national authorities by delegating to the Commission. These preference outliers generally show more support for fishermen and less support for environmental protection than their governments as a whole do. Their dependent variable is the difference between the agreed TAC and the proposed TAC for each

species and fishing zone, and statistical analysis finds that the Fisheries Council increases TACs to a lesser extent when they are more concerned with protecting the environment. They do not look at overfishing, citing a lack of data at the time.

Since the early 1980s, the council has worked to strengthen conservation rules and expand data collection. A 1992 amendment gave the Commission the power to close fishery resources, and established a transnational system to monitor conservation. From 2001 to 2004, DG XIV published compliance scorecards detailing the amount of overfishing occurring, and member states' compliance with EU regulations concerning fisheries. Those scorecards were discontinued beginning with 2005, and are not expected to resume (source: e-mail from DG XIV). We can see a "ratcheting-up" of regulation and compliance efforts at the Commission level. Franchino and Rahming find two strategies at work here: mutual constraint and reliance on the Commission.

Daw and Gray (2005) discuss the reasons why scientific advice on reducing fish quotas has not been put into practice at the EU level. They find that the advice of scientists is not adopted, technical and structural measures are stalled, and CFP regulations are poorly enforced. Daw and Gray's analysis, however, only gets at the reason why quotas are inefficient and still larger than is environmentally sustainable, not why there is substantial variation among the member states when it comes to overfishing; like Franchino and Rahming, they are looking at inefficiency in the setting of policy, not inefficiency in its implementation. Alcock (2002) notes that the basic distributive politics of who gets what are key to understanding fisheries policies in coastal states. As the EU has taken on fisheries policy at the supranational level, distributive battles are waged in Brussels at the same time enforcement battles are waged at the national and local levels

(Payne 2000). It is the second of Payne's nested games that this paper focuses on: that between member-state governments and their fishermen.

### **Regulation**

The only efficient outcome from a common pool resource problem is government regulation; by restricting the amount of fish that can be caught, the regulator (in this case, the European Union) is ensuring that there will still be fish for future generations to catch. If the CFP were rigorously enforced, both producers and consumers would lose: producers are not allowed to catch as much fish as they would like, and consumers pay higher prices for fish than they would if more fish were caught. However, the CFP is not rigorously enforced; because of overfishing, consumers and producers will lose in the future when there are far fewer fish to catch. Przeworski (2003) notes that in proportional representation systems, regulation is likely to be "extensive, detailed, and not credible." (p.106) If fishermen in PR systems are rational actors and do not expect regulation to be credible, one would expect them to overfish to a greater degree than fishermen in majoritarian systems under the same regulation.

The fact that both producers and consumers have similar interests when it comes to fishing in Europe is a challenge for understanding regulation in this case. If one thinks of the curves in Peltzman's model of regulation (Peltzman 1976), both producers and consumers want to move closer to the point of full monopoly (regulation causes transfers away from both producers and consumers), because both profits and demand would then rise, as the supply of fish in markets is kept artificially low by regulation. Both producers and consumers have an incentive to support overfishing, and since producers and

consumers make up the voting pool for regulators (the government), one would expect the government to support overfishing as well.

At the European level, then, there is a second common pool resource problem: each member thinks only of their own member-state, and does not consider the implications of overfishing on fish stocks as a whole in the region. Hallerberg (2004) addresses this when he discusses fiscal governance as a form of common pool resource problem.<sup>4</sup> There are two ways to deal with this in an efficient manner: delegation (vesting a certain minister with decisionmaking power) and commitment (contracts, with formal rules and targets). The Common Fisheries Policy is a clear example of commitment, which is to be expected if one thinks of the EU as a government with a coalition containing many ideological differences (the European Council). Evidence of this can be found in Franchino and Rahming, who noted both reliance on the Commission and mutual constraint in successive iterations of the CFP.

It should be noted that overfishing is completely rational on the part of individual fishermen. Economic discount rate theory would argue that the economically efficient strategy regarding a diminishing common pool resource is to take as much of the resource as possible, then invest the profits (the discount rate is even higher when one considers mortgaged boats and equipment). (Daw and Gray 2005) Moreover, the penalty for overfishing is not stringent enough to discourage individual overfishing.

The political economy literature has two different ways of looking at electoral rules: examining the role multiparty systems have versus single-party systems, and

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<sup>4</sup> See also Hallerberg and Marier 2004 for an example from Latin America and the Caribbean.

examining the role veto players play.<sup>5</sup> Numerous articles (Rosenbluth and Schaap 2003, Bawn and Rosenbluth 2006, Kayser and Rogowski 2002, and Linzer and Rogowski 2008, among others) argue that the key difference is between proportional-representation systems on the one hand and single-member-district-plurality, or SMDP, systems on the other. Tsebelis (2002), however, believes it is more important to understand the number of veto players (defined as any actor or collective body that can block change from the status quo) and measure the distance between relevant veto players in the system. In proportional representation systems, this generally means the average normalized ideological distance of the leftmost and rightmost parties in the coalition government. In either case, the idea is that more parties or veto players produce more access points for interest groups, and chances for groups to block change. I would argue that because producers actively want overfishing and consumers passively want overfishing, more parties or more veto players should produce more actors who seek to appease their constituents and have the power to do so, and more overfishing should result regardless of the ideological distance between coalition partners. Therefore, this paper concentrates on the number of parties.

Daw and Gray (2005) note that fisheries ministers face pressure from domestic fishing lobbies, and that unemployment and economic loss caused by the CFP are regularly reported by the national press. In addition, the diminishing resource pool can be blamed on foreign fleets (the Spanish fleets tend to be a traditional bugaboo in other EU member states), or mismanagement by the previous government. It is rational for politicians to allow some overfishing.

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<sup>5</sup> A third approach, such as outlined in Cheibub 2006, would involve presidential versus parliamentary systems. Such an approach cannot be tested in the E.U., which lacks true presidential systems.

Facing a small majority and difficult elections in 1997, the British Conservative government promised to “stand up for British fishermen.” But the Fisheries Council did not meet until the Labour Party had won a sweeping majority, and Britain supported a policy that was less supportive of British fishing interests. Daw and Gray note they could afford to do so by the size of their majority, as defection of the fishing lobby to another party would not have been critical in the subsequent election.

McGillivray (2004) would argue that one needs to look at more than just electoral rule when examining the degree to which industries in various states are protected. In her view, the combination of electoral rule and industry geography affect the industries legislators want to protect, while the combination of electoral rule and strength of parties affect which industries legislators are able to protect. Her example is the cutlery industry: in Britain, the cutlery industry was concentrated in Sheffield, an area with marginal parliamentary constituency seats hotly contested by the main political parties. As a result, Britain’s cutlery industry was well-protected, while Germany’s was not. Industries regionally concentrated in marginal districts (defined as those that can be gained with a swing of 5 percent or less of the vote) will receive trade protection.

The fishing industry is quite concentrated in Europe: western Galicia and the Basque Country in Spain, southern Brittany in France, and the Shetland Islands in the UK are particularly dependent on fishing and fisheries. Scotland, with 8.6 percent of the British population, brings in more than 60 percent of the total British fish catch each year. (Royal Society 2004). Total employment dependent on the fishing industry in Scotland (taking into account indirect effects) is about 48,000, roughly half the employment of the North Sea oil industry in Scotland.

This level of regional concentration has resulted in political action, as might be expected: the Committee for Survival in Brittany committed some violent acts against public buildings, while Save Britain's Fish in the UK has demonstrated regularly since 1990 (Lequesne 2000). However, fishing interests are not the same across the EU: in Spain and France, different organizations represent coastal fishermen and deep-sea fishermen, while the Scottish Fishermen's Foundation has traditionally supported the CFP, seeing it as protection in the North Sea from Norwegian fishermen. There is an EU-wide lobbying group known as Europeche, but not all national fishermen's organizations are members (Lequesne reports that the Portuguese and Finnish organizations cannot pay the membership dues). Within each EU member state, then, the fishing industry is fairly concentrated, though when taking the EU as a whole, the industry is fairly dispersed.

To the best of my knowledge, electoral-level data is not currently available to test McGillivray's theory across the EU,<sup>6</sup> though there is some extant anecdotal evidence. The Basque fleet is dominant in the fishing of anchovies in the Bay of Biscay, and the Cofradía is the fishermen's guild representing Basque anchovy-fishing interests. However, the two coastal Basque provinces voted for the PNV, the Basque nationalist party, in the most recent legislative elections (2004). The PNV generally votes with the People's Party, which is currently in opposition, though the PP had a majority of seats in the 2000-2004 elections and did not need the PNV's votes. The Galician provinces also voted for the PP.

In Scotland, three constituencies make up the areas where fishing is most important to the economy: Caithness, Sutherland & Easter Ross, Orkney & Shetland, and

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<sup>6</sup> Complete data on industry concentration across the EU is also not readily available.

Na h-Eileanan an Iar. The first two have been safe Liberal / Liberal Democrat seats for decades, with swings of 14.8 percent and 19.2 percent needed for a party swing, respectively. Na h-Eileanan an Iar, comprising the Western Isles of Scotland, was taken by the Scottish Nationalist Party from Labour in the 2005 election, and is considered a marginal seat, though the current swing needed for party change is 5.2 percent. According to McGillivray, this should indicate more protection for fishing in the future, though one can speculate that this impact would be lessened by the SNP's status as a minor party (if the constituency was a marginal seat between Labour and the Conservatives, it might be a different story). Likewise, the Liberal Democrats' closest competitors in Caithness, Sutherland & Easter Ross and Orkney & Shetland are the Labour Party and the SNP, not the Conservatives, who are Labour's biggest challengers nationwide. As there is almost no chance the Conservatives will take any of these three seats, we might expect to see less trade protection (and therefore less toleration for overfishing) in the UK.<sup>7</sup> However, McGillivray's theory would not predict minor parties using fishing as a wedge issue to gain votes, which has certainly happened in the UK.<sup>8</sup>

Another explanation for overfishing would involve a political business cycle, where governments allow more overfishing immediately before elections. A glance at existing data shows that this does not appear to be the case; in the UK, for example, overfishing increased after the 1987 general election, not before, and was sharply less in 1992 than in 1991 or 1993. There was a small increase in overfishing in 2001 compared

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<sup>7</sup> It should be noted that English constituencies where fishing is important, such as Blackpool North, are quite strong Labour seats.

<sup>8</sup> For an example, see the exchange between SNP MP Angus Robertson and Labour Foreign Secretary David Miliband in the European Scrutiny Committee in 2007: <http://www.publications.parliament.uk/pa/cm200607/cmselect/smeuleg/uc1015-ii/uc101502.htm>.

to 2000 or 2002. Spain experienced a very small increase in overfishing from 2003 to 2004.

Federalism should be considered here as well; in Spain, the autonomous communities of Galicia and the Basque Country negotiate directly with Brussels on CFP issues. However, there is not enough variation on federalism in the EU's fishing countries to enable a statistical analysis. It is possible that overfishing varies within federal states; greater overfishing in the Basque Country versus Galicia, for example. Unfortunately, the European Commission does not keep such regional statistics, and there is no extant anecdotal evidence.

### **Theory and Research Design**

The main hypothesis, then, based on the CPE literature on electoral rules, is as follows:

**H1: States with proportional-representation electoral systems will overfish to a greater degree than will states with single-member-district electoral systems.**

**Moreover, PR states with a greater effective number of parties will overfish more than PR states with a smaller effective number of parties.**

The mechanism at work here relates to the increased number of access points for special interest groups in proportional-representation systems, which have larger numbers of parties than SMDP systems, per Duverger's Law. I test this data on a dataset created from various sources, primarily the European Commission's CFP compliance scorecard.<sup>9</sup>

The existing data, as compiled by the European Commission from 2001 to 2004, does pose some challenges. There are three separate indicators of overfishing – numbers of quota over-runs, number of fish caught above the quota, and percentage over the quota

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<sup>9</sup> The unit of analysis is the country-year.

– so I choose to run three separate models, with each as the dependent variable in turn. As number of overruns is a count variable which appears to follow a Poisson distribution, I perform a Poisson regression with OVERRUNS as the dependent variable.

The latter two indicators produce significant outliers, because the quotas are not the same for each country, each area of the sea, or each fish. For example, the Netherlands was 28.13 percent over its quota of anglerfishes in the Irish Sea in 2003. Its quota was 16 tons and its actual catch for that year was 20.5 tons. In the opposite direction, Dutch fishermen caught 1420 more tons of Atlantic herring in the English Channel and southern North Sea than was allowed under the quota in 2003, but because the quota was so large (32,118 tons), this was only 4.42 percent above the quota. (see table 1 for summary statistics on overfishing in 2004).<sup>10</sup> In order to compress these extremes of scale, I use the logarithm of each – LOGOVERFISH and LOGOVERFISHPCT – in two separate ordinary-least-squares regressions.

As stated above, the lion's share of the data comes from the DG-XIV CFP compliance scoreboard, and covers the years 2001 to 2004. Extra data provided by Franchino and Rahming, and based on ECJ cases, is fragmentary, but provides datapoints for overfishing by France in 1988, 1990-1992, and 1994, and the UK in 1985-88 and 1990-1996 (though not all three indicators in all of those years). This gives me an unbalanced dataset, with an  $n$  of 57 for the overruns data, an  $n$  of 52 for the tons overfished data, and an  $n$  of 45 for the percentage overfished data. As a robustness check, I rerun all three regressions with a balanced dataset that does not have the fragmentary British and French data ( $n$  of 40).

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<sup>10</sup> It has been pointed out to me that this dataset underweights the fish an individual country's consumers care about the most. Future research will aim to correct this problem.

Country	Year	Tons of fish OQ	Percentage OQ
Austria	2004	0	0
Belgium	2004	29.7	25.38%
Denmark	2004	51.3	1.71%
Finland	2004	0	0
France	2004	0	0
Germany	2004	10.9	1.71%
Ireland	2004	2050.3	4.95%
Netherlands	2004	82.7	0.12%
Poland	2004	150	100%
Portugal	2004	78.6	15.1%
Spain	2004	283.4	16.9%
Sweden	2004	0	0
U.K.	2004	183.5	1.18%

**Table 1: Overfishing in the European Union under the Common Fisheries Policy.**  
Data from European Commission (2005).<sup>11</sup>

The cases selected are all EU member-states with assigned quotas under the CFP. Countries which do not have quotas (Hungary, Slovakia, Czech Republic, Cyprus, Malta, and Luxembourg) are left out, as are countries which have extremely small quotas (Austria and Italy only have quotas for the Atlantic bluefin tuna, while Estonia, Latvia, Lithuania, and Finland were only covered under Baltic Sea quotas beginning in 2005).

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<sup>11</sup> Italy, Greece, Latvia, Lithuania, Estonia, Slovenia, and Malta all have extremely-small quotas, and have to date reported no overfishing to the Commission. Hungary, Slovakia, Cyprus, the Czech Republic, and Luxembourg are not party to the quota system, as they do not have fishing fleets operating in the North Sea, Baltic Sea, or Atlantic Ocean (the Mediterranean Sea is not covered under the current common fisheries policy).

For the EU-15, the years covered are 2001 to 2004, while for Poland, the only new member with quotas, only 2004 is included.

I use three control variables in the analysis. Cochrane (2000) argues that overfishing worldwide is affected by the number of people employed in the fisheries industry, and amount of fish consumed per person. Data on these variables is available from the World Resources Institute: number of people employed in fishing and fisheries is updated every 10 years (the most recent data is from 2000), and kilograms of fish consumed per person per year is updated annually (though the most recent data is from 2002).<sup>12</sup> To compress extremes of scale, I use the logarithm of employment. These variables are titled LOGEMPLOYMENT and FOOD, respectively, in my analysis. I also add the control variable miles of coastline, LOGCOASTLINE, after using the logarithm, reasoning that it is harder for governments to prevent overfishing in countries with large coastlines (such as Spain) than in countries with small coastlines (such as Belgium). See Table 2 for descriptive statistics.

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<sup>12</sup> I do not control for exports of fish from EU countries, for fear of endogeneity with the other two control variables.

**TABLE 2: Descriptive Statistics**

	<b>Mean</b>	<b>Standard Deviation</b>	<b>Min</b>	<b>Max</b>
Tons overfished	1173	3549	-51.3	23620
Percentage over quota	13.95	34.87	0	193.5
# of overruns	3	2.76	0	14
Effective number of parties	3.45	1.7	2.09	9.36
Miles of coastline	10746	9231	41.2	31119
# of people employed in fishing	18267	17663	231	75434
KGs of fish eaten per person	25.5	13.2	0	59.8

### **Methods and Models**

I use an ordinary-least-squares regression model, then estimate coefficients from that model using the CLARIFY program for STATA 10.0 (Tomz, Wittenberg, and King 2003).

#### *Model selection*

There are two ways to approach the appropriate independent variable in this analysis, according to the main comparative political economy literature. I have chosen to use the Laakso-Taagepera measure of effective number of political parties (Taagepera 1999), categorized as EPP:

ONE. An OLS model of LOGOVERFISH on EPP, with LOGCOASTLINE, LOGEMPLOYMENT and FOOD as control variables.

TWO. An OLS model of LOGOVERFISHPCT on EPP, with LOGCOASTLINE, LOGEMPLOYMENT and FOOD as control variables.

THREE. A Poisson regression of OVERRUNS on EPP, with LOGCOASTLINE, LOGEMPLOYMENT and FOOD as control variables.

## Results

Because the EU measures overfishing in three separate ways, I choose to run three separate models, one for each method (tons overfished, percentage over quota, and number of overruns). In all three cases, the independent variable, effective number of parties, is statistically significant and in the expected direction. The greater the number of parties in the political system, the greater number of fish taken over the quota (see Table 3), the greater percentage over the quota (see Table 4), and the more quota overruns (see Table 5).

**TABLE 3: Statistical results**  
**Dependent variable: Tons of fish over the CFP quota**

	<b>MODEL 1 UNBALANCED</b>	<b>MODEL 2 BALANCED</b>
<b>Effective # of parties</b>	1.405** (.53)	1.201* (.51)
<b>Fish consumed</b>	-0.1004*** (0.03)	-0.013 (0.04)
<b>Employment in fishing</b>	2.112*** (0.67)	1.07 (0.69)
<b>Miles of coastline</b>	0.88** (0.44)	0.46 (0.45)
<b>Constant</b>	-25.1*** (9.35)	-14.38 (9.42)
<b>N</b>	52	40
<b>R<sup>2</sup></b>	0.25	0.170
<b>F</b>	3.91***	1.73

\* One-tail significance at the 0.05 level; \*\* Two-tail significance at 0.05 level; \*\*\* Two-tail significance at 0.01 level.

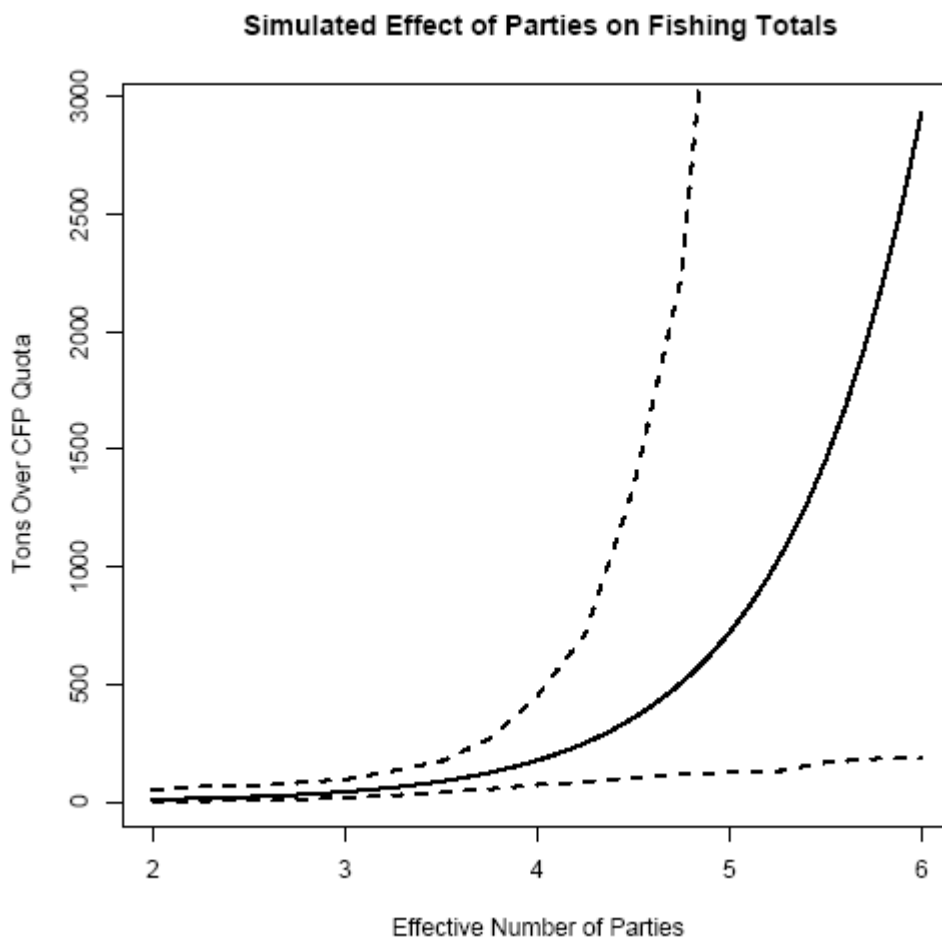
Both coastline and employment have positive effects on the amount of overfishing under the CFP; the larger the coastline, the more overfishing takes place, and the more people employed in fishing, the more overfishing takes place (though coastline is not significant in one of the three analyses). Both findings make intuitive sense. Interestingly, it appears the more fish is consumed by a given EU member-state, the less overfishing takes place. This is counter-intuitive, and points the way to possible future research in this area.

**TABLE 4: Statistical results**  
**Dependent variable: Percentage over the CFP quota**

	<b>MODEL 1 UNBALANCED</b>	<b>MODEL 2 BALANCED</b>
<b>Effective # of parties</b>	0.61** (.3)	0.28 (.28)
<b>Fish consumed</b>	-0.35 (0.02)	-0.018 (0.02)
<b>Employment in fishing</b>	1.205*** (0.39)	0.39 (0.37)
<b>Miles of coastline</b>	-0.13 (0.28)	-0.22 (0.24)
<b>Constant</b>	-10.36* (5.44)	-2.08 (5.08)
<b>N</b>	45	40
<b>R<sup>2</sup></b>	0.24	0.167
<b>F</b>	3.1**	1.76

\* One-tail significance at the 0.05 level; \*\* Two-tail significance at 0.05 level; \*\*\* Two-tail significance at 0.01 level.

Substantively, the predictions of H1 hold, and the model moves in the predicted direction. If the effective number of political parties were to move from two (a system somewhat like mid-1980s Great Britain) to three (a system similar to 2002 Ireland) in a given country (with all three control variables set to their means), that country would be expected to overfish by an additional 28 tons. See Figure 1 for a simulation of the amount of overfishing as the effective number of parties increases.



### Sensitivity Tests

Because of the smaller sample size, many of the variables in the analyses using the balanced dataset lose statistical significance, though the key independent variable

retains statistical significance in two of the three balanced dataset analyses. It appears this is due primarily to the small sample size; expanding the dataset by a power of 2 (resulting in an  $n$  of 80) shrinks the standard errors and produces a model which passes basic tests of statistical significance.

**TABLE 5: Statistical results**  
**Dependent variable: # of quota overruns (Poisson regression)**

	<b>MODEL 1 UNBALANCED</b>	<b>MODEL 2 BALANCED</b>
<b>Effective # of parties</b>	0.7*** (.12)	0.36** (.16)
<b>Fish consumed</b>	-0.028*** (0.009)	-0.011 (0.12)
<b>Employment in fishing</b>	0.923*** (0.16)	0.457** (0.19)
<b>Miles of coastline</b>	0.404*** (0.12)	0.157 (0.14)
<b>Constant</b>	-12.9*** (2.35)	-5.79** (2.87)
<b>N</b>	57	40
<b>R<sup>2</sup></b>	0.16	0.05
<b>Chi<sup>2</sup></b>	44.78***	7.15

*\* One-tail significance at the 0.05 level; \*\* Two-tail significance at 0.05 level; \*\*\* Two-tail significance at 0.01 level.*

Some may argue that fixed effects need to be added to the regression to actually model the processes described above. However, fixed effects “black box” what is actually going on inside a given country; miles of coastline, as a country-specific, time-invariant

variable, is both empirically and theoretically appropriate, and would run collinear with the fixed effect. Running a linear regression with panel-corrected standard errors produces no differences in the statistical significance of the coefficients in either model.

Selection bias could be at work in these models due to incidental truncation. We have no problem finding “dogs that don’t bark.” several EU members are not party to the CFP quota system, either because they are landlocked or because they lie on the Mediterranean Sea (where the quota system does not apply), although geographical location could be construed as the result of random selection. In addition, I doubt there is any correlation between the selection model and the real model.

I do not suspect endogeneity to be a problem in these models. Overfishing should not affect the independent variable, as the institutions causing large numbers of political parties and coalition governments were set up long before fishing quotas began to be enforced in the EU. However, there may be an endogeneity problem related to the coastline variable. Rogowski (1987) argues that states with large coastlines are more likely to be trading states, and trading states are more likely to adopt proportional representation.

I am concerned about measurement error in the dependent variable. The European Commission relies on self-reporting by member states of overfishing. Austria, Finland, Italy, and Greece, all party to Atlantic Ocean fishing quotas on bluefin tuna, have never reported overfishing. The Portuguese government claims its fleets overfished in 2001, 2002, and 2004, but not in 2003. The Spanish government similarly told the Commission that it did not overfish in 2002 (but overfished by large amounts in 2001, 2003, and 2004). In addition, some countries appear to be trading quotas in order to

overfish in certain areas, something which does not show up in the EU's CFP scorecard. Astorkiza, Del Valle, and Astorkiza (n.d.) note that Spain has 90 percent of the TAC for anchovies and is generally under quota. Interestingly, however, Spain has ceded part of its quota to France in exchange for exclusivity in the Bay of Biscay in the spring months. Spanish fishing interests have also purchased French boats and operate out of French ports as mixed French-Spanish enterprises in order to take advantage of French quotas in anchovies. In reality, then, Spain is overfishing its quota beyond what is reported, while France is underfishing its quota. There have also been reports of "quota-hopping," where Spanish fishing interests purchased British and Irish boats in order to be able to fly British or Irish flags and use the British or Irish quotas. (Payne 2000)

## **Conclusion**

The implications of the statistical analysis are clear; states with proportional representation electoral systems (which have larger numbers of effective political parties) find it harder to enforce the quotas under the Common Fisheries Policy, and as a result, fishing fleets in these states overfish to a greater degree than do fleets in states with smaller numbers of parties. This effect holds, no matter which of the three indicators of overfishing is used.

Competing explanations, such as those of McGillivray or the political business cycle, need to be tested more fully. I would also like to see if the results on the CFP apply to other self-restricting policy areas in the European Union: do proportional-representation governments find it harder to restrict aid to farmers under the Common Agricultural Policy, or maintain environmental constraints under the EU's environmental

policy? The ultimate impact of the above findings will lie in their generalizability towards implementation across the EU, regardless of policy area.

## Works Consulted

- Common Fisheries Policy Compliance Scoreboard. [http://europa.eu.in/comm/fisheries/scoreboard/index\\_en.htm](http://europa.eu.in/comm/fisheries/scoreboard/index_en.htm).
- Alcock, Frank. "Bargaining, Uncertainty, and Property Rights in Fisheries." World Politics 54 (July 2002), 437-461.
- Astorkiza, Kepa, Ikerne del Valle, and Immaculada Astorkiza, "Fisheries Policy and the Cofradias in the Basque Country: the case of albacore and anchovy." Working paper: n.d.
- Bailey, Jennifer L. "Hot Fish and (Bargaining) Chips." Journal of Peace Research 33:3 (August 1996), 257-262.
- Carter, Caitriona and Andy Smith, "Revitalizing public policy approaches to the EU: 'territorial institutionalism', fisheries and wine," Journal of European Public Policy 15:2 (March 2008) 263-281.
- Cochrane, Kevern L. "Reconciling Sustainability, economic efficiency and equity in fisheries: the one that got away?" Fish and Fisheries 1:1 (March 2000)
- Da Conceicao-Heldt, Eugenia, "Taking Actors' Preferences and the Institutional Setting Seriously: the EU Common Fisheries Policy," Journal of Public Policy 26:3 (2006) 279-299.
- Daw, Tim and Tim Gray, "Fisheries science and sustainability in international policy: a study of failure in the European Union's Common Fisheries Policy." Marine Policy 29 (2005) 189-197.
- Franchino, Fabio. "The Study of EU Public Policy: Results of a Survey." European Union Politics 6:2 (2005) 243-252.
- Franchino, Fabio, and Anne J. Rahming, "Biased Ministers, Inefficiency, and Control in Distributive Policies: An Application to the EU Fisheries Policy." European Union Politics 4:1 (Spring 2003) 11-36.
- Gordon, H. Scott. "The Economic Theory of a Common-Property Resource: The Fishery." The Journal of Political Economy 62:2 (April 1954) 124-142.
- Gray, Tim and Jenny Hatchard, "The 2002 reform of the Common Fisheries Policy's system of governance – rhetoric or reality?" Marine Policy 27 (2003) 545-554.
- Hallerberg, Mark. Domestic Budgets in a United Europe: fiscal governance from the end of Bretton Woods to EMU. Ithaca, N.Y.: Cornell University Press, 2004.

- Hallerberg, Mark and Patrik Marier. "Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Caribbean Countries." American Journal of Political Science 48:3 (July 2004), 571-587.
- Hardin, Garrett. "The Tragedy of the Commons." Science 162 (1968) 1243-1248.
- Hayes-Renshaw, Fiona, Wim Van Aken and Helen Wallace, "When and Why the EU Council of Ministers votes explicitly," Journal of Common Market Studies 44:1 161-194.
- [http://en.wikipedia.org/wiki/Results\\_of\\_the\\_United\\_Kingdom\\_general\\_election%2C\\_2005](http://en.wikipedia.org/wiki/Results_of_the_United_Kingdom_general_election%2C_2005)
- Lequesne, Christian, "The Common Fisheries Policy: Letting the Little Ones Go?" in Helen Wallace and William Wallace, eds., Policy-Making in the European Union. New York: Oxford University Press, 2000.
- Ostrom, Elinor. "Reformulating the Commons." Swiss Political Science Review 6:1 (2000) 29-52.
- Payne, Dexter C. "Policy-making in nested institutions: explaining the conservation failure of the EU's Common Fisheries Policy," Journal of Common Market Studies 38:2 (June 2000) 303-324.
- Peltzman, Sam. "Toward a More General Theory of Regulation." Journal of Law and Economics 19 (1976) 211-248.
- Przeworski, Adam. States and Markets: A Primer in Political Economy. New York: Cambridge University Press, 2003.
- Rogowski, Ronald. "Trade and the Variety of Democratic Institutions." International Organization 41:2 (Spring 1987), 203-223.
- Royal Society of Edinburgh, Inquiry into the Future of the Scottish Fishing Industry: Report Summary (March 2004).
- Smith, Lewis. "No More Fish to Eat in 40 Years." The Times (November 3, 2006) (<http://www.timesonline.co.uk/article/0,,3-2435290.html>)
- Taagepera, Rein. "The Number of Parties as a Function of Heterogeneity and Electoral System." Comparative Political Studies 32:5 (August 1999), 531-548.
- Tsebelis, George. Veto Players: How Political Institutions Work. Princeton: Princeton University Press, 2002.
- Williams, Nigel. "Quota Quandaries." Current Biology 18:1 (2008), R1-R2.