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# INSTITUTIONAL DESIGN UNDER WINDFALL CONDITIONS: THE NORTH SEA

by

KATHERINE A. VERLEGER

Under the Direction of Charles Hankla

## ABSTRACT

The 1959 discovery of oil and gas in the North Sea provides the analyst with an opportunity to observe the design of institutions governing the extraction of natural resources. Three states – the UK, the Netherlands and Norway – all industrialized, constitutional monarchies, faced significant political, economic and technical challenges in managing their new-found resources. All three states shared similar histories and yet designed different institutions to govern the extraction process. The wide variation creates a most-similar systems comparison, lending itself to guided, constructed, qualitative analysis. This analysis shows that regime preferences, domestic demand and international prices are significant variables in explaining the choice of level of state participation in the extraction process.

**INDEX WORDS:** Domestic demand, Europe, Institutional design, Institutions, International prices, Natural gas, Netherland, North Sea, Norway, United Kingdom, Petroleum, Political Economy, Regime preference, Windfall

INSTITUTIONAL DESIGN UNDER WINDFALL CONDITIONS: THE NORTH SEA

by

KATHERINE A. VERLEGER

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2013

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2013

INSTITUTIONAL DESIGN UNDER WINDFALL CONDITITIONS: THE NORTH SEA

by

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## 1 INTRODUCTION

Resource 'curses' have been widely studied and blamed for the ills of industrially developing and newly democratic states. Advice about resource extraction policies abound, their authors frequently citing evidence from other developing states. Much less studied is the impact of a resource windfall on states with established democracies and industrialized economies. Particularly when considering the balance between private actor and state control of such resources, examination of how well-established democracies have assembled new institutions can offer valuable insight into how newer democracies or states in transition can reach not only political goals, but social and economic welfare goals. It can also offer private economic actors more predictive analysis of where investment might be more sound, or more risky. The discovery of resource windfalls in democratized and industrialized states is unusual even when only considering single state cases. If the analyst is seeking an opportunity to examine several cases under relatively controlled conditions, the natural experiment arises in the North Sea.

In 1959, vast natural gas reserves were discovered in the Dutch portion of the North Sea, Slochterens. A 1965 discovery of oil followed in the United Kingdom's and Norway's portions. The discoveries of oil and natural gas in the North Sea present the analyst with a unique opportunity to comparatively examine the reaction of states to resource windfalls. The oil and gas finds of the North Sea overlap territorial water holdings of several states. Boundary lines among the seven sharing states (the UK, Norway, the Netherlands, Denmark, the Federal Republic of Germany, Belgium and France) had been established as part of the Convention on the Continental Shelf of 1958 (Dam, 1965): in terms of production, the most significant of these states are the United Kingdom and Norway, followed by the Netherlands and Germany.

The Convention on the Continental Shelf allowed each of these states to take individual approaches to management of their resource windfalls, which they did. The UK initially followed a *laissez-faire*, market-oriented approach of licensing private companies to explore for oil and gas within the British territorial waters, and anticipated taxing the product found and landed by the exploring companies. There were also some small auctions of licenses which were sold to the highest qualified bidders. While there was some small direct participation of the state in oil exploration and development, by and large, Britain contented itself to tax the oil found and sold, rather than sell it itself.

Norway, on the other hand, formed a state owned oil company, Statoil, in 1972. Statoil not only began to carry out exploration in the North Sea, but also served to "...substitute for [state] participation in production agreements..." (Klapp, 1982, p. 586) with multinational oil corporations to which Norway had already granted exploration and development licenses. Statoil was not the controlling partner in the initial period of North Sea production: its initial participation level was only 20%, setting up a public-private institution with a proviso that Statoil would become the dominant producer in Norwegian seas. Between 1972 and 1985 this initial participation level of 20% would rise to 75%, and would accomplish the *de facto* nationalization of Norwegian oil.

The Netherlands, however, had avoided direct, state-owned extraction of the resources in the ground in favor of allowing Royal Dutch Shell, the discovering firm of the natural gas resources, to form a joint venture with Esso (now ExxonMobil). This firm, Nederlandse Aardolie Maatschappij (NAM), would extract the gas under monopoly conditions and sell it under monopoly, to the pipeline, infrastructure and transportation firm Gasunie, a partnership between NAM and the Dutch government. The joint venture was overseen by Dutch State Mines, the govern-

ment ministry in charge of mining. The Dutch government taxed the product and transactions heavily, participated directly in the transportation of product, including transportation from seabed to terminal, but left sub-surface to seabed extraction in the hands of private actors.

Clearly, there were and are significant differences between British, Dutch and Norwegian approaches to managing their resource windfalls. What is particularly interesting is that all three states have broadly similar political structures. All three are parliamentary, constitutional monarchies, well established democracies, and have similar historical experiences, particularly in terms of experiences in World War II and participation in (if not membership in) the EU and EEA. All are northern European states, and had relatively homogeneous populations at the time.

How might the analyst explain the wide difference in the initial approach to management of resource windfalls? Windfalls offer a particularly striking opportunity to examine how these institutions are constructed in comparison to how institutions have evolved. Windfalls offer a dividing point in time: before the windfall was known, and after. This allows the analyst to look at the set of institutional arrangements that govern market and political behavior before the windfall to see how well they match to the institutional arrangements governing the windfall. The cusp-point of time allows the analyst to answer questions about state preferences for profit maximization and distribution, and to draw inferences about the preferences of the actors within the state from those institutions. Windfalls also offer an opportunity to examine institution formation in industrialized, democratic states *per se*, not as advisors to other states.

Three strong variables determining the structure of resource extraction governing institutions emerge: the ideology of the governing regime at the time of discovery, the international prices of the product discovered, and the domestic demand for the product just discovered. At the time of discovery, all three states' governments were considered center-left governments. However,

Norwegian center-left is considerably different from Dutch center-left, and both are different from British center-left. This allows ideology to continue as an explanatory variable. There was also significant variation in both the international product prices and the domestic product demand in all three states. Taken in combination with assumptions about government preferences about rent-seeking and re-election, domestic demand and international prices help explain the type of institutions initially designed by Northern European democracies to govern the extraction of their windfall.

## 2. LITERATURE REVIEW: INSTITUTIONAL DESIGN, RESOURCE EXTRACTION AND THE NORTH SEA

Windfalls offer a particularly striking opportunity to examine how these institutions are constructed in comparison to how institutions have evolved. Windfalls offer a dividing point in time: before the windfall was known, and after. This allows the analyst to look at the set of institutional arrangements that govern market and political behavior before the windfall to see how well they match to the institutional arrangements governing the windfall. The cusp-point of time allows the analyst to answer questions about state preferences for profit maximization and distribution, and to draw inferences about the preferences of the actors within the state from those institutions.

### 2.1 Institutional Design

Two major theories dominate the institutional design literature: modernization, path dependency and rational choice. Modernization focuses on developing and democratizing states, which are excluded from this work. Under path dependency, the dominant independent variable explaining institutional design is the preferences of regimes. Following Moore (1966), Skocpol (1979), and Pierson (1996 and 2000), these regimes' preferences would be built over time, as a function of the historical conditions under which the actors matured. The arc of time would culminate in an institutional design that reflects those preferences and the path taken to build those preferences. Close examination of these preferences in comparative perspective in Northern Europe is the focus of Esping-Andersen's (1990) work, with its particularly useful method of ranking relative preferences of governments at an aggregate level.

The other dominant theory of institutional design is rational choice. Under rational choice theory, the dominant explanatory variables for explaining the design of institutions gov-

erning resource extraction should be the levels of international prices and domestic demand for that resource. Initial global conditions would determine the volume of taxes the government could expect to generate from production and exports. Domestic demand, on the other hand, should determine the volume of cost savings that industry no longer would need to spend on imported energy supplies. Under pure rational choice, the governing regime should design institutions that, per Downs (1957), Arrow (1963), Olson (1965), and Rogowski (1989), maximize the likelihood of re-election, maintenance of and buildup of power.

## **2.2 Natural Resource Extraction and the North Sea**

Overall, the literature concerning the formation of institutions governing natural resource extraction falls into two groups. The first group focuses on product, theorizing that the institution formed depends on what the resource is. Almost all of these works title themselves as 'oil and gas,' or use the two products interchangeably in their bodies, but proceed to provide evidence for their positions that are focused on single products (e.g. oil or gas) oil production, without significant exploration of issues related to production of substitutes (e.g. gas for oil and vice versa).

The second group of literature is case specific, theorizing that the institution formed depends on the country in which the resource is found. In this work, the first group of literature is concerned with the specific North Sea energy products: oil and gas. The second group of literature is concerned with the specific experiences of North Sea states. Each group has advantages and disadvantages, leaving space for the analyst to explore alternative explanations. Both of these categories, by and large, date from the period surrounding the discovery. This means that the bulk of the literature predates the works of Keohane, North and Ostrom. The work of these authors, particularly, formulates theories about the formation of institutions that integrate political and economic variables.

The first category of literature of the North Sea oil seeks to explain regime preferences for characteristics of extraction. This literature is single-product: it seeks to explain either oil production or gas production, not explain both oil and gas production in the same work. It is typified by the works of Andersen, Correlje, Odell, Dam, Lind, D.I. MacKay, G.A MacKay, and Noreng.

Andersen (1993), for example, seeks to explain the policy choices made by Danish, British and Norwegian governments about extracting oil. He focuses on an institutional approach, writing that "...comprehensive policy paradigms play a key role in shaping governmental strategies" (Andersen, 1993, p. 12). Andersen uses political culture to explain why Denmark focused on speed in extracting its oil, why the British engaged in radical policy changes reflecting "...that the two major political parties hold different models of state roles in the economy" (*Ibid.*, p. 10), and why the Norwegians took a go-slow approach, allowing for significant state roles in the extraction regime. Andersen's unit-heterogenetic explanation -- that the policy choices of Norwegian, Danish and British regimes were simply a result of those regimes being Norwegian, Danish or British, respectively, are not overly generalizable, nor do they provide insight into processes that might be expected from regimes in other parts of the world.

Correlje and Odell (2000) also focus on a single case study (the Netherlands), but then narrow their focus further to explore natural gas exploitation. Their particular interest is in the political and economic aspects of the high speed with which the Dutch Groningen natural gas field was exploited, and the long-term production period it has experienced over forty years. Their explanation for the speed with which the Dutch government developed the Groningen field is two-fold. First, the Groningen gas field was, by industry standards, easy to exploit, particularly since the field is essentially coastal. Second, the Dutch government set itself up as the single

consumer of the raw product by establishing a joint venture in Gasunie, the natural gas pipeline firm. Gasunie had right of first refusal of all gas produced, allowing effective government control over production sales without direct ownership of the means of production. Additionally, because Gasunie had the right of first refusal, it was able to communicate the demands of Dutch industry for more and faster gas exploitation in the face of the first oil crisis of 1973-1974. Gas produced in Dutch waters never made it to non-Dutch markets: it was overwhelmingly bought by Gasunie.

The reasoning for the monopsonistic policies of the Dutch is found elsewhere in the literature: Ion, (1977, in Mangonne, Ed.), discusses the problems related to ownership of the Dutch resources. There were initial challenges by the (then West) Germans, who sought the resources for themselves. Cowhey (1985) demonstrates that the Dutch sought to control not only the rate at which they exploited their natural gas finds (fast) but the destinations of their natural gas sales (preferably not Germany).

Eckbo (1979) implicitly makes plain why this category of literature focuses on either oil or gas. Oil and gas are seen by economists as substitute. This means that when the price of oil goes up, the demand for gas shifts outwards, and vice versa. This single-product literature assumes that what it finds for one product implies that the other product has results that can be derived by using the laws of substitution from economics.

The problem with Eckbo's assumption is that the products are not perfect substitutes. States cannot easily switch their infrastructure over to gas from oil when the price goes up. There have to be separate infrastructures for each product, and the capacity of the infrastructures is not likely to be the same. Building redundant capacities is not efficient for the market, and it would not be likely to find either political or shareholder favor. Markets adjust to this lack of



perfect substitutability with relatively quick price adjustments: political institutions, on the other hand, cannot adapt so quickly. Further, by focusing on one product, the literature implies that the lessons of the substituting product are not significant or inherently valuable to the policy maker. The history of the institutions in question does not bear out that implication.

This single product focus problem is compounded in the second category of literature, focused on case studies such as Britain or Norway. G.A. MacKay and D.I. MacKay (1975), for example, seek to project and explain the economic impact of the UK's early push for fast exploitation of North Sea oil. They describe a Keynesian multiplier effect: that the rise in income in one segment of the participants in the economy will produce an increase in the demand for goods and services produced in other portions of the economy (MacKay and MacKay, 1975, pp. 162-163). They distinguish between the effects direct and indirect effects of oil, particularly for Scotland, and then follow modernization theory. Their concluding proposal is that the increased Scottish per capita income and employment would lead to calls for Scottish independence and devolution of the union of the United Kingdom.

The work of MacKay & MacKay (1975) is echoed in the work G.A. MacKay did with T. Lind in 1979, exploring the oil policies of Norway. MacKay and Lind's major finding is unit heterogenous: Norway's oil policies are a result of Norway's unique political, economic and industrial conditions. Particularly, they argue that Norway did not need the oil it found in the North Sea: its non-transportation energy requirements were met by the production of hydroelectric power. Because of this, MacKay and Lind conclude that Norway was able to focus on revenue maximization for the state, forming Statoil and ensuring the state owned enterprise had a significant to majority share in each and all exploration and extraction efforts. As also pointed out by Bromley (1991), a significant source of Norway's ability to carry out such a policy was

the lack of a balance of payments constraint, such as that faced by Britain.

There is also comparative literature that incorporates both Britain and Norway, primarily examining whether the state-focused or market focused approach is more optimal for the economic and political requirements of the state in question. Bromley (1991), for example, outlines the British approach to managing its resource windfalls. Britain, in essence, sought to use its windfall to address balance of payments constraints (Bromley, 1991). To get the money from extraction quickly, it invited foreign direct investment by American companies, and minimized involvement of the state by either privatizing or not building state owned enterprises that participated in production. He compares this to Norway, which took a much more state-centered, planned, go-slow development approach. Bromley explains this by characterizing the Norwegians as seeking to minimize the likelihood of an outbreak of Dutch disease, overwhelming the Norwegian economy and industry.

While unit heterogeneity is a common and even valuable explanation for policy choices, it leaves out two important elements. First, the resources of the North Sea are shared: the decisions made by one country will impact the decisions made by another. This is not only because the resources are non-renewable, but also because decisions made by one country will impact expectations of the market and market actors, such as product companies. Second, single case studies minimize an element of learning. By focusing on single case studies, the analysts make the implication that the experiences of one state (Norway, for example), are not significant or useful to the decisions of another (e.g. Britain).

### 3. VARIABLES

#### 3.1 Dependent Variable: Level of Privatization

The dependent variable this work seeks to explain is the set of policy choices made by the institution-formulating regime. These policy choices determine the kind of and level of state participation in the production process. There are two kinds of production processes in question: offshore production of oil, and offshore production of natural gas.

In oil, the production process is one of extraction. Using offshore oil rigs and derricks, oil is extracted from the seabed. Crude oil is a thick, viscous liquid that does not change its volatility significantly: once extracted, it is just as flammable as it is before extraction. Because of this, oil can be transported through a variety of means, including rail, truck, ship or pipeline. For offshore oil production, the production process ends when the oil enters its means of transportation: either a pipeline, or a ship.

Natural gas is a more complicated product than oil is. Natural gas is much more volatile once extracted than it is prior to extraction. During the extraction process, natural gas can *only* be transported through a pipeline.<sup>1</sup> Because the product's transportation is limited to pipelines, natural gas has to get to shore before it can be routed to its end-user. Because of this, the extraction process of natural gas does not end until the natural gas reaches the terminus, where it can enter a variety of pipeline systems.

The states designing institutions in the presence of windfalls, then, must choose some level of private participation and state participation in the production process. This process can range from wholly public, in which the state completely controls process by which oil or gas is

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<sup>1</sup> Liquefied natural gas requires that the product be landed and refined before the product can be loaded on to tankers or trucks. As a consequence, LNG is not considered as part of this work: it is a post-extraction process.

produced, to wholly private, in which the state, having leased out its resources, does not participate in the production process at all. Most states, including the Netherlands, the UK and Norway, choose some level of privatization between the two ends of the spectrum. In the case of the United Kingdom, the emphasis was on the market. In the case of the Netherlands, there was a combination of market and state actors. In the case of Norway, the state was a direct actor in all extraction measures.

### **3.2 Independent Variables: Regime Type, International Prices, and Domestic Demand**

The degree of private operation of production is determined by three independent variables. The first is the preferences of the government in power. These are largely set by the ideological orientation of the party in government. The second variable is the international prices that can be gotten abroad for the institution-designing state's product.

Third is the domestic demand for the product. These three variables are additive, resulting in institutions that are not wholly determined by any one of the independent variables.

#### ***3.2.1 Regime Preferences: A Spectrum of Institutional Design and Implementation***

In the construction of institutions of any sort, the state building the institution has a spectrum of options with three major nuclei. At either end of the spectrum are options for a state focused institution or a market focused institution. Between the two extremes, a third option is an institution that combines the elements of state and market focus.

At one end of the spectrum, a wholly state focused institution leaves private actors out of the extraction process. The resource is nationalized and production is nationalized. The market's

first entry into the transactional process is when the product comes to a market outside of the state. The best example of a wholly state focused solution would be found in the USSR, where state owned enterprises were wholly in control of the production process until product arrived on the global market (such as the state owned natural gas enterprise Gazprom, and the natural gas transportation across the USSR owned Druzhba pipeline to western Europe).

At the other end of the spectrum, a market focused institution, at its extreme, would identify the resource in question as wholly belonging to some non-state party. The resource is private and production is private. Prices and quantities supplied would be wholly a function of the market at the time of production and the expectations about the future state of the market for the commodity. The state's role in the process would be limited to one of taxation, either at the point of sale, at the point of reports of corporate income, or at some other transactional point defined by the state's taxing authority. The best examples of such a solution is found in 19<sup>th</sup> and early 20<sup>th</sup> century America, particularly around the mining of gold and the early oil industry.

Finally, an institution combining state focus and market focus might be implemented. Such an institution might allow for state ownership and some role for the state in production, but would also allow non-state, market actors to participate relatively fully in the production process. It is such a combination that is in effect in almost every commodity market in the world. From case to case, only the relative weights of market participation and state participation that vary.

What is puzzling, then, is how Norway, the United Kingdom and the Netherlands, three relatively similar states, reacted so differently to their North Sea windfalls. It is reasonable to expect that similar states would have similar reactions in terms of the weight of state focus and market focus in institutional design responding to windfalls. In the case of the North Sea, however, the three cases' responses are notably different.

Explanations for these choices might be found in the preferences of the state, which logically, should be a function of the state's past experience with managing either (a) resources or (b) windfalls, and also of the policy preferences of the designing regime. A more conservative, right-leaning government, for example, could be expected to design an institution with a stronger market focus than state focus, and vice versa. These preferences, however, are also influenced by the international conditions surrounding the onset of the windfall which cannot be ignored. Those conditions shape and form the institutions that will govern the windfall. The independent variable for regime preferences, then, follows the political position of the government in power. For this work, the preferences of governments are divided into two broad groups: interventionist (left-leaning) and *laissez-faire* (right-leaning).

*Government Orientation Hypothesis a: a more laissez-faire government will favor an energy-extraction institution that gives private industry more weight in the production process than the state. Such an institution is likely to be partially or wholly privatized.*

*Government Orientation Hypothesis b: a more interventionist government will favor an energy-extraction institution that gives the state more weight in the production process than private industry. Such an institution is likely to strongly favor a state-owned enterprise.*

This hypothesis seeks to answer the question 'what effect do regimes' preferences have on the policy choices regimes make governing windfall extraction?' If the government is left-leaning and favors market intervention, then the policy choices should show more state focus. On the other hand, a right-leaning government should make policy choices that are more market focused.

Regardless of whether the governments are market or state focused, in this hypothesis, the initial conditions surrounding the discovery of the windfall are not as important an influence

on the construction of the extraction-governing institutions than the government's preferences are. This is seen in the preference of the Netherlands and the UK for fast extraction. The UK needed the energy quickly for its industry and the revenue to address balance of payments constraints (an issue of significant concern to the regime at the time). The Netherlands was convinced that if it did not extract the gas quickly, then the advent of cheap nuclear power would make its newly found natural gas reserves worthless. This is also seen in the preference of Norway for slow and revenue maximizing energy institutions. Norwegian industry did not immediately require the energy, whereas the long term revenues would never be unwelcome.

### ***3.2.2 Initial Conditions: International Prices and Domestic Demand***

The term 'initial conditions' is well understood in conventional economics, however, it gets muddled when dealing with institutional political economy. In terms of this work, 'initial conditions' refer to the economic circumstances that are in play in the global market. While initial conditions have impact on the economic circumstances internal to the state discovering the windfall, they are mostly external to the state. States are singular players. The initial conditions of the global economy are a function of the aggregated economies of the aggregated states of the world. Because the global economy has so many participants, even at the nation-state level, a single state is not able to exert deterministic power over the economy at any given time. When a resource discovery is made, the discovering state is subject to the decisions it has already made, and that all the other economies have made in the global market. In the context of resource discoveries, the only way a state can set the initial conditions it will face when it discovers its windfall is if it possesses perfect foresight (excluded as an option given the cases).

The particular initial conditions faced by these states are narrowed as follows: global demand for the windfall good (operationalized as the international price of the windfall good),

extraction costs, and the internal initial condition defined by domestic industrial need for the windfall good (operationalized by the quantity of energy products used by the country in terms of million tonnes of oil equivalent (MTOE))<sup>2</sup>. The most significant of these conditions are price and internal need, and are identified as international prices (IP) and domestic demand (DD).

The initial conditions' impacts on policy formulation are additive. No state faces high domestic demand in isolation from either high or low international prices or from right-leaning or interventionist governments. As a consequence, the definitions and impacts of the variables are spelled out, but hypotheses are only tested for the additive situations.

These variables are termed initial conditions, rather than economic conditions, because their levels are set prior to the discovery of the windfall. Governments attempt to control economic conditions as part of their mandate: they set targets for inflation, unemployment, GDP growth, export growth, trade deficits and other economic variables. They cannot, however, change conditions in the present that are a result of either past market conditions or past policy positions levels, unless the windfall discovered happens to also be a time machine.

### *3.2.2.1 Initial Conditions: International Prices*

Under high international prices, all states are resource-rent maximizers. Some states maximize directly (by extracting and selling the resource directly), some maximize indirectly (by taxing the resource extractors). High international prices offer states opportunities to grab revenues while they can: they did not have the revenues prior to the windfall, and market volatility means they may not have them tomorrow.

There is little potential downside to the state entering production directly when international prices are high. High international prices provide an opportunity for states to generate rev-

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<sup>2</sup> This allows for the comparison of products: coal usage vs. natural gas usage vs. oil usage vs. hydroelectric.



venues from foreign entities – corporations and citizens who buy the product from the state (and who, being foreign, cannot retaliate against the government at the ballot box).

States enter production directly under high international prices for two additional reasons. First, direct extraction allows the state to minimize revenue collection costs: by extracting the product and selling it directly, the government avoids potential tax evasion by extractors. Second, by directly producing, states have the opportunity to fully internalize rents generated by the resource: if they rely on an indirect method, significant portions of the rents are lost to the private actors. To accomplish a similar level of internalization would require that states set a taxation level so high that private actors could not be induced to develop the windfall resource.<sup>3</sup>

Low international prices, on the other hand, do not offer states immediate revenue possibilities. In fact, they offer states just the opposite. In the presence of low international prices, any move the state makes toward getting involved in extraction of the resource will only be costly to the state. The state will have to use resources to formulate its own engagement policy, or to encourage private actors to enter the market: using resources carries costs, which, with low international prices, will be harder to (if not impossible to) recoup. Because the potential revenues are so much lower, there is no motive for the state to get involved, directly or indirectly, in extraction. Indeed, if prices are *too* low, then it is likely that the resource will not be developed at all by either private or public actors. Absent a resource-rent motive, the state spending resources on developing extraction rules is irrational.

*International Prices Hypothesis a: when prices are high, the government's level of privatization in extraction is lower than when prices are low.*

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<sup>3</sup> Examples of such evasion are myriad, and not limited to energy. They include the evasion of resource taxes in post-Soviet Russian energy ventures and the evasion of taxes on hardwood harvesting in the Solomon Islands (Dauvergne, 1998) and Brazil (Bannerjee *et al*, 2009).

*International Prices Hypothesis b: when prices are low, the government's level of privatization in extraction is higher than when prices are high.*

### *3.2.2.2 Initial Conditions: Domestic Demand*

If domestic demand for the product is high at time of discovery, the regime's policies will push for private development of the resource. The reasoning behind this is somewhat counter-intuitive until fully explored. As with high international prices, when domestic demand is high, governments are presented with a revenue motive. In the international price variable, resource rents come from abroad when international prices are high. When domestic demand is high, the resource rents are domestically generated. When prices in the international market are high, governments with resources within their sovereign territory can 'tax' foreigners by selling them their valuable products.

On the other hand, *ceteris paribus*, when domestic demand for those products is high, the revenues that governments can generate from the resource come from their own constituents. Governments prefer to generate revenues in such a manner that minimizes the burden on their citizens: it increases the likelihood of their re-election (which is, per Downs, 1957, the dominant preference of any government). When the public has a high level of demand for a resource, the burden on the public imposed by high government involvement in the extraction of the resource is also high. Domestic users of the resource product are trapped by the path of industrial development followed in the past. Absent technological methods that allow the users to switch to the cheapest resource at will, a domestic user of energy resources must use the resource their equipment is designed for. As a consequence, regardless of the price of the product, users are forced to consume roughly the same amount of product, spending more per unit of production, or to cut

production to keep their costs the same (which reduces their revenues, while not reducing their costs).

High domestic demand for product, then, creates political pressure to keep product prices low. The drive to be re-elected, then, pushes governments to select a level of privatization that allows the market actors to dominate extraction. There are two major reasons for this. First, when market actors dominate the extraction regime, governments can satisfy their rent-seeking interests by taxing the extractors. Second, with low levels of privatization, the state-owned extractor will face considerable political pressure to sell product at prices that neither meet operational costs nor satisfy the rent-seeking preferences of the government. No matter how low the prices are, the voters would prefer the prices to be still lower<sup>4</sup>. Any price that a state-owned extractor of resources charges to domestic consumers will be too high and will create a retaliation motive against the government that runs the state-owned enterprise. Since governments prefer to re-election over all other options, they will seek to avoid creating reasons for constituents to vote for their opponents.

If, on the other hand, the government allows private actors to dominate extraction, then the blame for domestic product prices falls on the corporations doing the extraction and selling. The corporate revenues can be taxed at a level set and controlled by the government granting the extractors access to the resources. The *dominant* preference for re-election is met (voters blame companies, not the governments granting the companies the extraction license), and the revenue-generation preference is satisfied (corporations' abilities to retaliate against governments at the ballot box is limited).

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<sup>4</sup> This is why, even when world prices are low, if domestic demand is high, the government controlling the new-found resource will prefer to push the burden of high payments on to the shoulders of corporations. When demand is high, the quantity consumed outweighs any potential benefit that could be gained from low prices. A prime example of this is found in Brazil, where charcoal is the dominant product demanded for fuel, but the government leaves harvesting of wood for charcoal production to private actors (Bannerjee, *ibid*).

The counterparts to the international prices hypotheses, then, are the domestic demand hypotheses.

*Domestic Demand Hypothesis a: when domestic demand for a resource is high, ceteris paribus, governments will have higher levels of privatization in the extraction process.*

*Domestic Demand Hypothesis b: when domestic demand for a resource is low, ceteris paribus, governments will have lower levels of privatization in the extraction process.*

### **3.3 Additive Variables: the Simultaneous Impact of Regime Preferences, International Prices, and Domestic Demand**

Government orientation, international prices, and domestic demand are additive in impact on the level of privatization selected by the government. A *laissez-faire* government facing high international prices and high demand will cushion the potential for retaliation by voters that can be provoked by overly high government involvement with the high rents governments can seek by selling the product abroad. The result is a high point of privatization.

An interventionist government facing high prices and high domestic demand, on the other hand, will dominate the extraction role in order to rent-seek from abroad. The level of privatization is, however lower than the optimal level for staving off voter retribution. Voters (and therefore governments courting re-election by those voters) prefer higher quantities of product to lower quantities, and lower prices to higher: higher quantities and lower prices are most easily accomplished when the market is able to run without state owned enterprises' participation.

The *laissez-faire* government's preference for extraction by private actors continues to dominate the institution when prices and domestic demand are low. Under low international prices, governments would prefer to leave extraction in the hands of market actors, *ceteris paribus*. This saves the government costly development projects that may not pay for themselves.

The interventionist government, on the other hand, takes advantage of the windfall to accomplish political goals, such as improving domestic employment levels. Even when international prices are low, an interventionist government can use the moderate rents generated to pay for expanded employment opportunities in the new state owned product-extracting enterprise. Further, low international prices can give the interventionist government a reason to include private industry as a participant in a joint venture to cushion the expensive exploration costs. Under such conditions, the interventionist government can structure joint-venture agreements in such a way that the political aims of the government are met.

When domestic demand is low, however, both interventionist and *laissez-faire* governments prefer higher levels of participation than they do when demand is high. When domestic demand is low, the quantity of product used and the number of users is not so big that the government's participation in extraction would provoke a meaningful number of voters to retaliate at the ballot box. The voters would be unhappy – but there would not be enough unhappy voters for the government to worry about its re-election chances.

As a result, when prices and demand are low, the level of privatization is moderate, between the two points. For a *laissez-faire* government, this will be a high-moderate privatization level, still favoring the market over the state. For the interventionist government, this will be a low-moderate privatization level, favoring the state over the market.

Low prices combined with high demand produces consistently high privatization levels. Both *laissez-faire* and interventionist governments have no international rent motive to enter into extraction. Further, they have a ballot box disincentive deterring them from entering extraction at home. The result is a high level of privatization. The interventionist government is likely to

engage in some token level of exploration and production, but will allow the market to dominate the institution.

Likewise, high prices paired with low demand result in low levels of privatization: *laissez-faire* and interventionist governments have significant rent motives to enter into production internationally, and the domestic deterrent to entering production is not big enough to keep government from trying to maximize revenues. In an interventionist regime, the likely result is a wholly state-owned enterprise. Even a *laissez-faire* government will dominate the institution, but still allow private market actors to have some role in extraction.

The result of the additive impact of the variables are the hypotheses that will be tested here:

*Additive variable hypothesis 1: high prices combined with high demand result in moderate levels of privatization with regime preferences dominating the degree of moderation.*

*Additive variable hypothesis 2: low prices combined with low demand result in moderate levels of privatization with regime preferences dominating the degree of moderation.*

*Additive variable hypothesis 3: low prices combined with high demand result in high levels of privatization, even in interventionist governments.*

*Additive variable hypothesis 4: High prices combined with low demand result in low levels of privatization even in laissez-faire governments.*

Table 1: Potential outcomes from price / demand combinations

Regime Type	Level of Privatization	International Prices	Level of Privatization	Domestic Demand	Level of Privatization	Additive Level of Privatization
Laissez-faire	High (+)	High	Low (-)	High	High (+)	High-Moderate (+++)
Laissez-faire	High (+)	Low	High (+)	Low	Low (-)	High-Moderate (+++)
Laissez-faire	High (+)	Low	High (+)	High	High (+)	High (++++)
Laissez-faire	High (+)	High	Low (-)	Low	Low (-)	Low-Moderate (+--)
Interventionist	Low (-)	High	Low (-)	High	High (+)	Low-Moderate (--+)
Interventionist	Low (-)	Low	High (+)	Low	Low (-)	Low-Moderate (-+-)
Interventionist	Low (-)	Low	High (+)	High	High (+)	High-Moderate (-++)
Interventionist	Low (-)	High	Low (-)	Low	Low (-)	Low (---)

## 4 METHODOLOGY

This work will follow a mixed method approach of most similar systems design and structured, focused comparison. Most similar systems research design (MSSD) is a method by which as many extraneous differences among the data sources are eliminated. This creates a situation of a natural experiment: the variation is limited to the variables of interest. One of the often-cited problems with using MSSD is that it is rare to find a set of cases that qualify for a strict utilization of the MSSD criteria. Ljiphart characterizes this as the "[too] many variables, small number of cases" (Ljiphart, 1971, p. 685) problem.

This can be addressed by relaxing some of the MSSD requirements. Rather than requiring identical characteristics in all but the dependent variable, in applying a relaxed MSSD project the researcher chooses "to study countries that appear to be similar in as many background characteristics as possible, but where the researcher never systematically matches the cases on all the relevant control variables" (Anckar, 2008, p. 390). This is the approach taken here.

Having selected three most similar states, this study will follow George and Bennett (2005), using a method of structured, focused comparison. This process is as follows:

1. Structured: particular research questions are asked of each case study (Structured)
2. Focused: the study "...deals only with certain aspects of the historical cases examined" (George and Bennett, 2005, p. 67)
3. Comparison: The answers to step one are compared across cases.

In this particular work, the questions would be as follows:

1. What were the regime preferences at the time of discovery?
2. What were the international product prices at time of discovery?
3. What was the domestic demand for product at the time of discovery?



The particular aspects dealt with by this study are governing regime characteristics, international prices, and domestic demand at the time of the discovery.

As this is a qualitative work, the comparison will be largely one of historical analysis and process tracing. Evidence supporting hypothesis or another would lie in the repetition of institutional elements or introduction of new elements. For example, the Norwegian's role of Statoil, as opposed to having fixed tax rates, would indicate that the government's drive for rents from the international markets were more dominant in institutional design than the domestic demand for the product. The particular methodology will focus on direct comparison. Looking at the institutional features and design processes should indicate strength of the independent variables – international prices and domestic demand.

## 5. CASE STUDIES: THE NETHERLANDS, THE UNITED KINGDOM, AND NORWAY

### 5.1 The Netherlands

#### *5.1.1 Initial Conditions: International Prices and Domestic Demand*

The Groningen field of natural gas was discovered in 1959. The Netherlands was fortunate in that unlike the United Kingdom and Norway, the Dutch natural gas reserves were both shallow and close to shore. This would offset some of the extraction issues associated with the product. Natural gas is volatile and difficult to move. Unlike oil, which can be transported in trucks and ships, gas requires specialized infrastructure, pipelines, to be brought to market. As a consequence, the production of natural gas is not simply a matter of extracting the gas from the seabed, but also of moving it through pipelines to the utilization point. Natural gas pipelines were already in use in the Netherlands, however a new set demanded to be built to land the gas at Rotterdam and bring the product into the national gas transportation network. These pipelines took four years to complete, and came online in 1963.

As described earlier, the Dutch government allowed Royal Dutch Shell to form a joint venture with Esso, called Nederlandse Aardolie Maatschappij (NAM), and granted NAM a monopoly on the extraction of gas from the seabed.<sup>5</sup> Once extracted, however, a joint venture between the Dutch government and Royal Dutch Shell, Gasunie, had the first rights to purchase of the gas for their pipelines – including those pipelines that transported the gas from the wellhead to the shore. In essence, the monopoly extractors only owned the gas as far as the sea floor: then

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<sup>5</sup> The records of these negotiations (if any) remain unavailable for examination.

they had to sell it to the joint venture that was half-owned by the government. The Dutch gas extraction process was three quarters private, one quarter state owned enterprise.

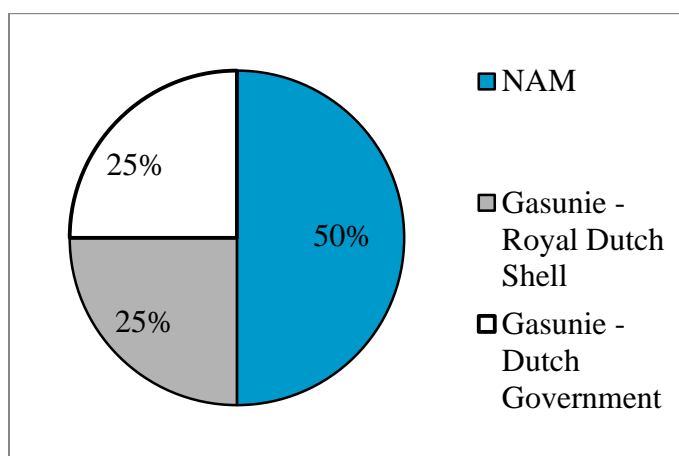


Figure 1: Dutch Gas Extraction Ownership

Between 1959 and 1963, the Dutch government set up the guidelines by which the gas would be extracted and transported. These guidelines were set through a series of confidential negotiations between the companies that procured the gas from the seabed and the government, eventually allocating a near monopoly to Royal Dutch Shell, which formed a joint venture with Esso (now ExxonMobil), called Nederlandse Aardole Maatschappij (NAM). The Dutch government, in turn, formed a joint venture with Royal Dutch Shell, Gasunie, to build pipelines through which the gas would move from the seabed to the terminus in Rotterdam. Gasunie operated as a monopsony: any natural gas extracted had to be offered to it first for purchase, and only gas owned by Gasunie was allowed to move through Gasunie's pipelines.

When setting up the explicit monopoly of NAM and Gasunie, the Dutch government also set a very high tax rate: approximately 70% of the profits went straight into the Dutch government coffers. Further, because the demands of Dutch energy were met by municipal utilities, the Dutch government was in a position to regulate the prices at which Gasunie could sell its product

to the three classes of users: industry, households, and generation. The government would take the opportunity of its windfall to push prices quite low and thus increase sales volume exponentially over the first 10 years of the Groningen pipeline's operation. The Dutch had already established, in essence, a state-owned energy supplier. What its preference was was to leave this particular institution alone -- and adapt the institution of the State (Coal) mines for the governance of production, and build a new institution, Gasunie, a 50/50 split between the state and private transporters. This control over the natural gas extraction from underground to the seabed in the hands of market actors, but every natural gas transaction thereafter dominated by the state, which owned half the transportation system – and took 70% of the profits from both the other half of the transportation system and the extraction system. This sets the balance of power in the hands of government: 25% controlled outright, and 35% by taxation, for a domination of 60% of the institution.

### ***5.1.2 The Netherlands: Preferences and Regime Type***

Table 2: Dutch Institutional Design Options

Regime Type	Initial Conditions (global)	Initial Conditions (domestic)	Predicted State / MarketWeight
Laissez-Faire	Low Price	Low Demand	$M > S$
Laissez-Faire	Low Price	High Demand	$M > S$
Laissez-Faire	High price	Low Demand	$M > S$
Interventionist	High Price	High Demand	$S > M$
Interventionist	Low Price	Low Demand	$S > M$
Interventionist	Low Price	High Demand	$S > M$
Interventionist	High Price	Low Demand	$S > M$

Between 1959 and the present, Dutch governments have been mostly formed by centrist or center-left parties, occasionally shifting further left when the Labor party is in power (as it was at the time of the discovery). These have leaned toward more interventionist positions when run by labor and more laissez-faire when Christian democrat or centrist. Prices were relatively high: the demand for natural gas within Europe was relatively high, and the lesson taken away from the Suez crisis was that securing cheap oil was important -- not that finding non-coal or non-oil energy sources was critical.

In the Netherlands, the demand was relatively low: the economy was largely agricultural and labor intensive, not industry intensive. The expected outcome, then, should be that the institutional design should favor a stronger market role in the extraction process than government role. The case of the Netherlands demonstrates that the perceptions of and preferences about the product -- and about the use of the state's revenues -- are particularly significant in resource extraction regime design.

Between 1948 and 1970, the Dutch government was notably left leaning. Between 1948 and 1958, the Dutch Labor party (Social Democrats) was in power. They were followed by the Catholic People's Party, a Christian democrat, center-left party, in power until 1966, then returning in 1967. The intervening government was also Christian democrat, the Anti-Revolutionary party. The governments of the lowlands have stayed in this alignment to the present time.

These left-centrist regimes reflected the general historic preferences of the Netherlands. In the 1950s, the Dutch economy was significantly reliant on an agricultural base. Labor tended to be cheap, so after WWII, industry was beginning to relocate into the country. This was dampened by the natural disaster of the 1953 floods and the resultant necessity of the Rine / Maas Delta Scheme -- a massive construction project of flood control by dikes, dams and levies that was

funded by the government (and thus the taxpayer). Interest rates and population growth rates were high: as a consequence, there was significant enthusiasm for the development of the Common Market. The Common Market would provide opportunities for the Dutch farmers to sell their products at reduced or eliminated tariff rates among member states, would increase the number of consumers demanding goods from the NL, and generally expand the production possibility frontier for the entire country.

The immediate preferences for the state in terms of state / market relationships about the natural gas in Groningen, then, were formed by the Tinbergen plan formulated in the Central Plan Bureau. This plan called for the prioritization of national welfare: improving employment figures, increasing the presence of and role of industry in the economy, reducing real interest rates, and increasing the size of the social safety net the government could make available to the citizens (Odell 2002, 307-310). This would lead the analyst to expect an institution dominated by the state.

Groningen, in essence, would be able to accomplish several goals:

1. it would free up Dutch resources from having to acquire fossil fuel resources from abroad
2. the sale of natural gas would be able to relieve the financial burden on the government for building the Delta Scheme
3. its exploitation would increase the attractiveness of the NL to relocating industry.

Energy in the Netherlands was largely sold by "...municipal or provincial owned utilities, which, given the Netherlands' system of national control over local purse strings, could also be considered as quasi-state operations" (Odell, 2002, p. 308). The state had recently formulated an

approach to economic and social management that would promote a welfare optimization strategy. This was a new approach for the state: in the past, the Dutch government had been much more laissez-faire in its approach to economic regulation. When setting up the explicit monopoly of NAM and Gasunie, the Dutch government also set a very high tax rate: approximately 70% of the profits went straight into the Dutch government coffers. Further, because the demands of Dutch energy were met by municipal utilities, the Dutch government was in a position to regulate the prices at which Gasunie could sell its product to the three classes of users: industry, households, and generation. The government would take the opportunity of its windfall to push prices quite low and thus increase sales volume exponentially over the first 10 years of the Groningen pipeline's operation. The Dutch had already established, in essence, a state-owned energy supplier.

The government's preference was to leave this particular institution alone -- and adapt the institution of the State (Coal) mines for the governance of production, and build a new institution, Gasunie, a 50/50 split between the state and private transporters. The state, then, only directly controlled 25% of the natural gas extraction process: the majority of the control of extraction was in the hands of market actors. On the surface, this would refute government orientation hypothesis, as well as additive hypothesis 4.

### 5.1.3 *The Netherlands: Initial Conditions – International Prices*

Table 3: Prices of Dutch Natural Gas

Year	Price per 1000 m <sup>3</sup> (Nominal Dutch guil- ders)	Price per 1000 m <sup>3</sup> (\$2008)**
1962*	150	263.71
1963*	130	224.29
1964	80	136.63
1965	58	97.34
1966	58	94.40
1967	58	92.16
1968	28	42.66
1969	43	62.44

\* Pipeline not completed and delivering gas until 1963.

\*\* Conversions of currency to real, 2008 US dollars by author

(Source: Odell, 2002 & personal communications; IEA & OECD, 1998)

As seen from Table 3, at the time of discovery, natural gas prices were relatively high abroad but were, in real terms, falling. By and large, the international demand for natural gas in Europe was relatively low in this period: most states relied on coal for their energy demands. Gas is a more efficient mechanism for producing energy, and the Dutch government could reasonably expect international demand to stabilize at a favorable rate. Indeed, Odell (2002) shows that there were significant concerns on the part of the Dutch government about potential pressure from West Germany to demand sales. These high international prices should lead the Dutch governments to favor lower levels of privatization.



### ***5.1.4 The Netherlands: Initial Conditions - Domestic Demand***

In 1963, the Dutch were not using a lot of natural gas to power their cities or industries: only about 3% of its total energy use (Oil & Gas Journal, 1970). The overwhelming power source was coal, biomass, or wind (Odell, 2002). To encourage the use of natural gas, the Dutch government, exercising its monopoly on sovereignty, dictated to Gasunie that the price of natural gas for domestic consumption would be reduced, and reduced dramatically, to 5.8 Dutch cents (d.c.) per therm in 1965. In that year, 97.9% of Gasunie's product was sold within the Netherlands: by 1969, that figure dropped to 65.2%. The Netherlands bought 500.3 billion cubic feet of natural gas ( 500.3 bn x .0283 m<sup>3</sup>) at the newly set price of 4.6 d.c. per m<sup>3</sup>: Gasunie paid 3.66 d.c. per m<sup>3</sup> to the producers -- and the Dutch government took 70% of that. And during this period ('63-'69), the Netherlands went from getting 3% to 25% of its energy from natural gas. (Dutch Central Bureau of Statistics).

At the outset, then, the only way for the Dutch government to generate the significant revenues it demanded from its windfall to fund the sea wall project would be to drastically increase the quantity of natural gas sold. Within the Netherlands, demand was low: by utilizing a variety of subsidies and incentives to encourage energy producers and end-users (such as households) to shift their product preference to natural gas, the Dutch government increased the demand for the product. One of those incentives was to force the price of natural gas down. The government was able to accomplish this because the production firms were monopolistic joint ventures between Shell-Esso and the Dutch government, and the transportation firm, Gasunie, was a monopsonistic private-public partnership. As the dominant partner in these arrangements, the government was able to unilaterally set the prices at a point that would maximize the quantity of gas sold, and thus maximize the revenues that could accrue to the state. The low domestic

demand, then, should lead the state to favor higher levels of state dominance. The interventionist Dutch government, however, only directly owned 25% of the process: not a high level of state dominance.

It is at this point that examination of the transactions involved with extraction shows the effective level of control and accrual of profit in the Netherlands. 75% of the natural gas extraction process was in the hands of market actors, and 100% of the process of bringing the gas to the seabed in the hands of market actors. However, from a financial perspective, the state dominated every transaction involved with natural gas from the time the gas got to the seabed to the time it got to utilization. Not only did the Dutch government own half the transportation system – including the pipelines that brought the natural gas from the seabed to the shore and distribution points, but the government set a 70% tax rate on profits for every natural gas transaction – including extraction from the seabed. This meant the government controlled 70% of the profits from the other half of the transportation system (35% of the process overall), 70% of the extraction system (another 17.5% of the process overall), and directly owned 25% of the transportation. This sets the balance of power in the hands of government: 25% controlled outright, and 52.5% by taxation, for a domination of 77.5% of the institution. Figure 2 provides a graphic representation of the distribution.

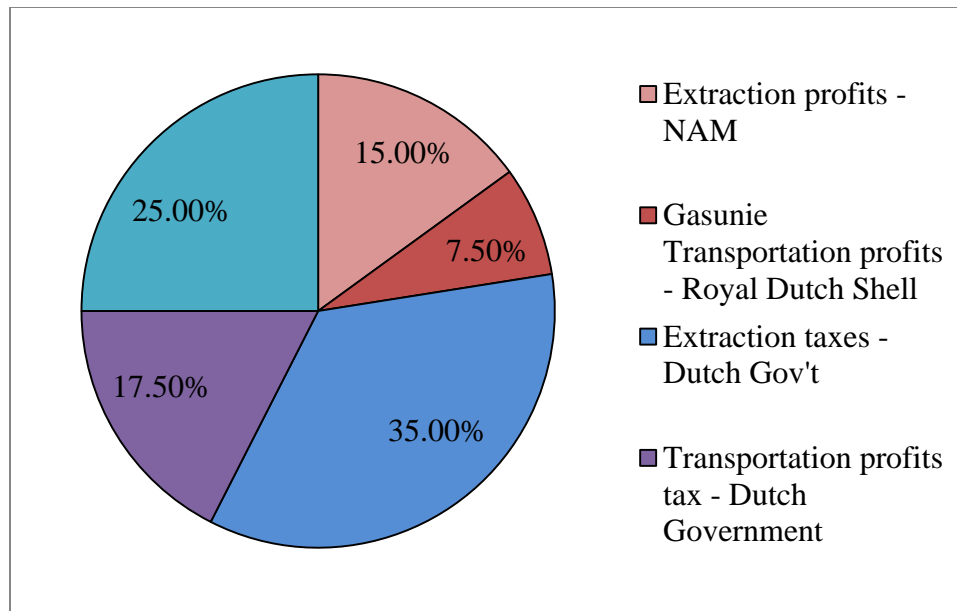


Figure 2: End Control of Dutch Gas Profits

The Dutch regime included government participation, and dominated the critical transportation sector of the natural gas extraction process. International prices were high, allowing the government to rent-seek from abroad by utilizing its partially-publicly owned pipeline network. Domestic demand, however, at the initial design point was low, correlating with the presence of government actor in the market. This leads to the confirmation of additive hypothesis 4: high prices combined with low demand results in low levels of privatization, regardless of government orientation.

## 5.2 The United Kingdom

### 5.2.1 *Overview: Institutional Characteristics*

The oil of the North Sea, east of Scotland, was discovered in 1965. The meteorological conditions of the North Sea under the best of circumstances could be called ruthless. The usual conditions are extremely hazardous to human operators as well as to the complex industrial structures demanded to extract oil from between 300 (100 m) and 2,300 (700 m) feet below the sea surface. This is then exacerbated by the demand to drill approximately 2500 – 3150 m under the seafloor to reach the oil. Unlike natural gas, oil can be transported to shore in tankers, although pipelines are more efficient and came online 1975 in the UK's section of the North Sea, well after the initial exploitation rules were set up.

Between 1965 and 1966, the British government set up the guidelines by which the oil of the North Sea would be extracted. These rules called for a closed-envelope bidding process to obtain leaseholds within a group of blocks made available for auction. The rules did not explicitly call for drilling to be carried out: a company could take out a leasehold on a block without actually drilling exploratory wells in it. However, since the auction process was qualitative as well as quantitative, a bidding company that did not plan to drill in a block in which it held a lease could find that its bid to renew the lease was not accepted. Further, the rules allowed for the Minister of Power (later, the Minister of Technology, and then the Minister of Technology and Industry) to step in and require the company implement an exploration regime of the Minister's devising (Utton, 1968).

The primary instrument the British institution relied on for revenue generation was taxation. There were two tiers of taxation: petroleum revenue tax (PRT) and corporate tax (CT). Corporations extracting oil from the North Sea identified what their petroleum revenue was and

the amount of CT due the government (Rowland and Hann, 1987). Unlike the Dutch case, in which the government granted monopolies for extraction and thus was able to directly tax single participants, the British were faced with multiple companies extracting oil from multiple fields. The regime granting licenses for exploration was a qualitative auction, where one of the conditions for obtaining a license to explore and extract oil was meeting governmental preferences about proposed speed of extraction. Firms frequently had several fields, and as might be reasonably expected, not all fields were equally productive.

The accounting method in the British extraction institution allowed for exploring and producing firms to offset one field's failure to produce oil against another field's production. With multiple fields, it was frequently the case that the net product that a firm extracted was below the total amount of oil exempt from taxation (10.16 million metric tons per year). Given that production fell below that amount for the entire UK until 1976, it is hardly surprising that the government generated little revenue from the PRT. The UK was also unable to generate revenue from the CT on oil companies. Oil exploration is expensive: the accounting rules for deduction of exploration costs from production revenues during this period were such that CT revenues to the government were also quite small. Block licenses were cheap: no more than £72,500 per year (MacKay and MacKay, 1975). In the first four rounds of licensing, a total of 245 licenses were issued, with a maximum total potential rent of £2,662,500 (\$45,567,772) per year. Given the cumulative contribution of oil revenues to GDP between 1973 and 1978 of 14,680,000,000 (\$38,270,760,000), the government's share of 0.07255% hardly seemed equitable (Atkinson and Hall, 1983 and MacKay and MacKay, 1975, author's calculations).<sup>6</sup>

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<sup>6</sup> By comparison, if this had been oil produced in the Dutch portion of the North Sea, the Government's share of the revenues would have amounted to £10,276,000,000 (\$26,789,532,000).

Table 4: British Institutional Design Options

Regime Type	Initial Conditions (global)	Initial Conditions (domestic)	Predicted State / Market Weight
Interventionist	High Price	High Demand	$M \approx S$
Interventionist	High Price	Low Demand	$S > M$
Interventionist	Low Price	High Demand	$S > M$
Interventionist	Low Price	Low Demand	$S > M$
Laissez-Faire	High Price	High Demand	$S > M$
Laissez-Faire	Low Price	High Demand	$M \approx S$
Laissez-Faire	Low Price	Low Demand	$M > S$
Laissez-Faire	High Price	Low Demand	$M > S$

### 5.2.2 *The United Kingdom: Preferences and Regime Type*

Whereas the Dutch focused on commerce, particularly after 1813, the British focused on industrialization since the mid 18th century. The path of British finance, however, was somewhat similar to that of the Dutch. British firms depended "...heavily on internally generated funds and issues of equity for finance" (Hall, 1986, p. 38). In the case of Britain, however, banks and financial institutions emerged tied to regions and industries present in those regions. A system of finance and industry that consists of a large number of actors with significant local knowledge emerges, from which classic neoliberal ideas about economic behavior and governance emerge. The economy industrialized to such a degree that 95% of the labor force in Britain was not engaged in agriculture by 1950 (ibid, p. 27).

The role of the government in this economic system at the time of the formulation of the North Sea oil regime was one in which British policy makers "...[embraced] a variant of Keynesianism which suggested that higher levels of investment and employment could be sustained

through the management of aggregate demand. Policy was to be aimed at ... the achievement of full employment, and manipulation of fiscal and monetary policy was to be used to attain it" (Hall, 1986, p. 50). Industrial policy would be deployed to try to provoke full employment, along with manipulations of monetary and fiscal policy. Where the Dutch saw industrial policy as having significant public interest elements that necessitated a stakeholder model, the British governments, from 1918 on, largely asked industries to devise processes of reorganization and reallocation of resources

British governments took a hands-off approach to the industries of the country. They asked industry to reorganize, rationalize and reallocate resources, capital and labor among themselves. Compulsory regimes of rationalization, reorganization and reallocation were eschewed in favor of the encouragement of cooperative schemes encouraging the formation of trade associations. These trade associations were encouraged by the prospect of being able to engage the government in negotiations. Such negotiations had the potential to produce tariff protections, subsidies, tax concessions or import quotas that were favorable to the members of the trade associations (following Olson's interest group theories of collective action). Hall (1986) cites the Coal Mines Act of 1930, which created a government-recognized and empowered cartel protecting British corporate coal interests as a typical example of the British preferences for state / industry relations.

Such a set of preferences would lead the analyst to expect the British to take a similar, hands-off approach to the decisions about extracting North Sea oil. Instead, what is seen is a closed-envelope auction system, favoring some producers over others based on non-market points of their exploration proposal. The process was not reliant wholly on the market auction principles which would have led the highest bidder to win the rights to explore and extract from

any given allocation. Furthermore, the process was not transparent at all: given the import of transparency and availability of information to prospective investors, this is surprising from a state with such generally pro-market preferences.

### 5.2.3 *The United Kingdom: Initial Conditions – International Prices*

Table 5: Global Crude Oil Prices & British Production - 1965 to 1978

Year	Price (\$nominal)	Price (\$2008)	Production (Million tons per year)	Production (thousand barrels per day)
1965	1.80	12.34	0.1	2
1966	1.80	11.97	0.1	2
1967	1.80	11.66	0.1	2
1968	1.80	11.19	0.1	2
1969	1.80	10.62	0.1	2
1970	1.80	10.02	0.2	4
1971	2.24	11.97	0.2	5
1972	2.48	12.83	0.3	8
1973	3.29	16.01	0.4	9
1974	11.58	50.78	0.4	10
1975	11.53	46.34	1.6	34
1976	12.80	48.62	12.2	253
1977	13.92	49.65	38.3	792
1978	14.02	46.47	54.0	1119

(Source: BP Statistical Review of Energy, 2009)

As seen from table 5, at the time of discovery, prices were quite low abroad and were, in real terms, falling. Between the point of discovery (1965) and the point at which production first landed oil on the shore (1970), prices fell from the 2008 equivalent of \$12.34 to the 2008 equivalent of \$10.02.



lent of \$10.02 (18.66%). The British government expected oil prices to continue to fall (Lee, 1965). The low international prices reduce the rents that the British government would have been able to extract from foreign consumers of oil, and thus reduce its rent-seeking motive. The low prices correlate with the low level of government participation in extraction, confirming international price hypothesis b.

#### ***5.2.4 The United Kingdom: Initial Conditions – Domestic Demand***

Table 6: British Energy Consumption

Year	Production MTO/year	Consumption MTO / year	Total Consumption MTOE / year
1965	0.1	74.2	196.8
1966	0.1	79.5	197.5
1967	0.1	85.3	197.2
1968	0.1	90.4	204.3
1969	0.1	97.3	211.8
1970	0.2	103.6	216.7
1971	0.2	104.3	212.8
1972	0.3	110.5	215.8
1973	0.4	113.2	226.3
1974	0.4	105.3	215.0
1975	1.6	92.0	202.8
1976	12.2	91.4	206.8
1977	38.3	92.0	210.6
1978	54.0	94.0	211.4

(Source: BP Statistical Review of Energy, 2009)

At the point of discovery, the overall energy production of the United Kingdom was only 109.8 million tons of oil equivalent (MTOE) (OECD Factbook, 2008). Domestic oil production accounted for only 182,500 (.2 million tons) of that. On the other side of the equation, however, by the time the first North Sea oil was landed in 1970, the United Kingdom consumed 103.6 mil-

lion tons of oil alone per year. The North Sea product, then, was only an additional 100,000 tons, or barely one-tenth of one percent of the quantity demanded domestically.

Further, unlike the Netherlands, where natural gas accounted for 3% of the total energy demanded at the time the first Groningen gas was landed, in the United Kingdom, oil accounted for 16% of the total energy demanded at the time of discovery. Oil consumption was rising, as well: six years earlier, oil had been only 11% of total energy demand. (Lee, 1965). The expectation for the period between 1964 and 1970 was for a 100% increase, to 85 MTOE per year, about 22% of the total energy demanded in the UK at 1965 levels. (ibid.)

The high and increasing level of domestic demand further reduces the government's level of participation in production. The Wilson government of 1965 held only a narrow majority of only four seats, making retaining power as Prime Minister in any upcoming election difficult. Wilson, further, faced opposition from within his own government when the idea of a British National Oil Corporation was suggested at the national Labour convention in 1968. the Minister of Power at the time, Roy Mason, writing that the Study Group proposing BNOC did not "...pay sufficient regard to the risks associated with a venture of this kind, the heavy calls on capital, and the technical problems of entering into this highly specialized field. There are a number of ways of securing a greater public stake in the North Sea without establishing a new public body" (Mason, 1968, p. 2).

The level of privatization selected by the British Government favored private industry over government participation. This position confirms additive variables hypothesis three. When international prices are low and domestic demand is high, then the state selecting the privatization institution will favor higher levels of privatization.

## **5.3 Norway**

### **5.3.1 Overview: Institutional Characteristics**

Norway's earliest oil was found in the Ekofisk field, discovered by Philips Petroleum, in 1969. Production came online in 1971 using tankers. The Norwegian oil reserves were difficult to get at, lying in the deepest part of the North Sea. As in the United Kingdom and in the Netherlands, Norway built pipelines to make transportation more efficient.

Norway formed a state owned oil company, Statoil, in 1972. Statoil not only began to carry out exploration in the North Sea, but as a state-owned enterprise, entered into production agreements with multinational oil corporations to which Norway had already granted exploration and development licenses since 1965 (when oil was first found in the British region of the North Sea). Statoil initially controlled only 20% of the oil produced in the Norwegian North Sea, but the laws governing extraction and the charter of the new state owned enterprise had stipulations in it that Statoil would become the dominant producer in Norwegian seas. This dominance would rise to grant Statoil 75% ownership of the extraction process, and would accomplish de facto nationalization of Norwegian oil both directly and through a series of joint ventures.

Table 7: Norwegian Institutional Design Options

Regime Preferences	Initial Conditions (global)	Initial Conditions (domestic)	Predicted State / Market Weight
Interventionist	High Price	High Demand	$S > M$
Interventionist	High Price	Low Demand	$S > M$
Interventionist	Low Price	High Demand	$S > M$
Interventionist	Low Price	Low Demand	$S > M$
Laissez-Faire	High Price	High Demand	$M \approx S$
Laissez-Faire	High Price	Low Demand	$M > S$
Laissez-Faire	Low Price	Low Demand	$M > S$
Laissez-Faire	Low Price	High Demand	$M \approx S$

### 5.3.2 Norway: Preferences and Regime Type

The Norwegian path to independence, industrialization and democracy is very dissimilar to those paths taken by the UK and the Netherlands. While the Netherlands was effectively a colony of the French until 1813, its previous experience in the Hanseatic League and success with the Dutch East India Company gave it a uniquely Dutch economic base, and, importantly, a history of corporate investment (and associated legal structures). The UK had not been a colony, but rather a colonist, controlling nearly 1/5 of the world's surface land at the time of its industrialization. Norway, on the other hand, was a tributary of Denmark from 1537 to 1814.<sup>7</sup> As a result, unlike the UK and unlike the Netherlands, Norway's economy was "...monocultural, unskilled, [raw-materials] based and rather much like an enclave" (Hveem, 1991, p. 6) cut off from

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<sup>7</sup> After the Danes (allies of Napoleon) lost the Napoleonic wars in 1814, Norway was transferred as a colony to Sweden, which allowed significantly greater autonomy to its new acquisition, but also continued the Danes' mercantilist economic policies.

the avenues of development on continental Europe. Norwegian industrialization would come to rely heavily on those avenues in the 2nd half of the 19th century. Much of the physical and technological capital that Norway would utilize in its industrialization would come as direct imports from the UK or Germany (Hveem, 1991). Large scale industrialization would not begin until the 1880s, well after the adoption of the Norwegian constitution and its accompanying social democratic principles (Wicken, 2007).

The Norwegian constitution exemplifies the core of Nordic social democracy. The root elements of Norwegian social democracy tie to Norway's centralized and institutional state principles. The centralized state tradition combines with the institutional state tradition in Norway, explaining the state government as a group of professional decision makers working on behalf of a society that is a 'moral community' that goes through the "...gradual development of identities, loyalties, norms and values in political and administrative institutions." (Christensen, T., 2003 p. 172) The centralized state tradition of Norway emphasizes conscious, central control of design, redesign and implementation of public structures by political and administrative agents of citizens. This emphasis "...covers both the constitutional design of public powers and the internal organization of public bodies" (*ibid.*)

The centralized Norwegian state tradition is augmented by the institutional state tradition. The core of the institutional state principles is the Norwegian negotiated economy, which defines the structure of state / market relationships. A negotiated economy "...works through an institutional setup, where advisory boards consisting of stakeholders advise the relevant Minister. Formally, the system is centralised, but in reality the stakeholders have a strong voice" (Christensen, A-S., Nielsen and Olesen, 2007, p. 551).

The combination of the centralized and institutional principles helps explain a tendency on the part of the cabinet and parliament (Storting) toward cooperative decision making and consensus, low levels of conflict, and high levels of shared values, while also reflecting individualized characteristics of particular ministries (Christensen, T., 2003). This might be compared to the Dutch system, which gives the government a strong voice in corporate decision-making, but acts more as a hyper-alert watchdog protecting the public interest, not as a sheepdog herding the companies in pro-social directions. Certainly the Norwegian 'sheepdog' approach to state / market structures is far removed from the British 'retriever' approach, which relied on a carrot and stick approach to attempt to get industry to engage government in mere dialogue (much less follow government's lead).

The central and institutional state identities in Norway developed simultaneously and parallel to one another. In the central and institutional view, the creation "...of a good society and enhancing moral progress" (Christensen 2003, p. 174) was a critical and central role for the state. Indeed, the importance of the existence of "...an interventionist state that would steer a capitalist economy by means of major economic development programmes based both on economic theory and economic indicators" (*ibid.*, p. 167) dates to 1873. The evolution of the social welfare state, with its broad range of entitlements and benefits, is a logical progression from such a conception of the state's identity. A critical element of this social welfare state was commitment to full employment (Esping-Andersen, 1990). The interventionist state in Norway moved proactively toward fulfillment of this commitment on a progressive and forward moving trajectory. The discovery of oil in the North Sea would prove critical to the fulfillment of this goal.

In light of this goal and the path of the Norwegian centralized and institutional state with its negotiated economy, it would not be unreasonable for the analyst to expect a state dominated

exploration and extraction industry. One might go so far as to expect oil to be wholly controlled by some variety of state owned enterprise. Certainly the formation of a state owned enterprise would be less complicated than entering into joint ventures -- yet that is precisely what Norway did. Statoil, the Norwegian state oil company, was a partner in all exploration and extraction ventures in the Norwegian portion of the North Sea -- but it was not entirely in control of those ventures. The path of the institutional and centralized state was somehow routed on to a detour - - just as the paths of the Dutch quasi-corporatist state and the laissez-faire British state were.

### 5.3.3 Norway: Initial Conditions – International Prices

Table 8: Global Crude Oil Prices & Norwegian Production - 1965 to 1978

Year	Price (\$nominal)	Price (\$2008)	Production (Million tons per year)	Production (thousand barrels per day)
1965	1.80	12.34	-	-
1966	1.80	11.97	-	-
1967	1.80	11.66	-	-
1968	1.80	11.19	-	-
1969	1.80	10.62	-	-
1970	1.80	10.02	-	-
1971	2.24	11.97	0.3	6
1972	2.48	12.83	1.6	33
1973	3.29	16.01	1.6	32
1974	11.58	50.78	1.7	35
1975	11.53	46.34	9.2	189
1976	12.80	48.62	13.7	279
1977	13.92	49.65	14.0	287
1978	14.02	46.47	17.4	356

Source: BP Statistical review of World Energy, 2009

As in the United Kingdom, at the time of the Norwegian discovery, oil prices were quite low. Between the point of discovery (1969) and the point at which production first saw oil landed on the shore (1971), prices fell from the 2008 equivalent of \$10.62 to the 2008 equivalent of

\$10.02, then rose to the 2008 equivalent of \$11.97 (an increase of 19.46%). Although prices had begun to rise, the first significant price spike from OPEC I did not occur until 1974, when they increased by 350% from \$3.29 to \$11.58 (nominal). The Norwegians, then, were able to observe a price change that resembled a parabola: prices dropped from a low point to a lower point, then moved to a price point higher than the initial point and continued to climb. In the absence of demand changes, this should lead a center-left government to push for a regime in which the level of privatization is higher.

### 5.3.4 Norway: Initial Conditions – Domestic Demand

Table 9: Norwegian Energy Consumption

Year	Oil Consumption MT year	Hydro consumption MTOE	Tot Consumption MTOE year
1965	5.2	11.2	17.3
1966	5.9	11.0	17.8
1967	6.1	12.1	19.0
1968	6.7	13.6	21.3
1969	7.4	13.0	21.5
1970	8.3	13.1	22.4
1971	8.2	14.5	23.7
1972	8.5	15.4	24.8
1973	8.6	16.7	25.7
1974	7.7	17.3	25.6
1975	8.0	17.5	26.1
1976	9.0	18.6	28.1
1977	8.9	16.3	26.1
1978	9.3	18.3	28.5

Source: BP Statistical review of World Energy, 2009

Two sources of data dominate research into early North Sea exploration. The first is British Petroleum's annual Statistical Review of World Energy; the second, the Organization for



Economic Cooperation and Development's statistical data set. Unlike BP, the OECD breaks down energy use by type and industry. E.g., both BP and the OECD sets can tell the analyst that 20% of a given country's energy comes from coal, but the OECD will tell the analyst that 40% of that coal went into industry, and 25% into transportation.

Table 10: British v. Norwegian Energy Consumption, 1965-1978

Year	British Consumption MTO	British Total Consumption MTOE	British % energy met by oil	Norwegian Consumption MTO	Norwegian Total Consumption MTOE	Norwegian % energy met by oil
1965	66.111	414.6787	5.94%	2.888	9.350866	30.88%
1966	71.722	399.69	7.94%	3.073	9.599718	32.01%
1967	73.531	390.3827	8.84%	3.089	9.968558	30.99%
1968	83.1	392.6241	1.17%	4.856	12.2363	39.69%
1969	91.699	403.836	2.71%	5.268	12.90133	40.83%
1970	101.964	408.28	4.97%	5.792	13.568	42.69%
1971	105.394	403.6753	6.11%	5.811	13.58381	42.78%
1972	107.124	358.5126	9.88%	6.45	14.52872	44.39%
1973	113.221	396.2591	8.57%	6.497	14.73663	44.09%
1974	109.776	369.9736	9.67%	6.329	15.18586	41.68%
1975	92.919	355.2989	6.15%	7.66	16.5505	46.28%
1976	98.061	363.7886	6.96%	8.458	17.8482	47.39%
1977	93.728	360.636	5.99%	8.463	17.55389	48.21%
1978	94.14	355.5068	2.48%	8.41	17.08948	49.21%

Source: Stats.OECD.org, December 6, 2011, author's calculations .

OECD aggregate figures indicate that Norway's energy demands were more oil dependent than the UK's were. On average, BP figures that 32.85% of Norway's energy was met by oil between 1965 and 1978, and the UK 45.44%. For the same period, the OECD's figures for Norwegian oil consumption average to 41.51% and the UK 24.38%. This would initially suggest that the hypothesis suggesting that states are averse to dominating extraction when domestic demand for a product is high is not supported by the Norwegian experience

However, what BP figures do not show is the use of the oil. On average, between 1960 and 1978, 41.96% of Norway's oil went into transportation: planes, trains and automobiles. For the same period in the UK, only 25.45% of the oil went to transportation. At the time of Norwegian discovery, 1969, the UK used 21.68% of its oil in transportation: the Norwegians used 37.18%. Further, although Norwegian transportation in 1969 used a greater percentage of Norway's energy than British transportation (15.87% vs. 5.42%), the total MTO used for transportation in Norway was, on average, 9% of the MTO used for transportation in Britain.

The UK, on the other hand, never used less than 70% of its oil for purposes other than transportation between 1960 and 1978. This speaks to a much more diversified economy. More and different types of industries used oil in the UK than did in Norway (which, in an average year for the period, used 58% of its oil in something other than transportation). Because Norwegian oil uses were highly concentrated into a single field (transportation), the aggregate economic demand for energy was met by sources other than oil. This is backed up by the diversity of energy sources in the two countries, as well as their GDP aggregate and per capita figures.

By OECD figures, in 1969, 66.31% of Britain's energy came from coal, with the balance split between oil (22.71%), natural gas (5.88%), hydroelectric and nuclear power (5.1%). Coal is labor intensive, and thus voter intensive. In such a concentrated energy field, any increase in getting energy from oil will necessarily reduce the percentage provided by coal, and, barring significant economic expansion, cause greater coal-related unemployment. British GDP growth across the period of discovery (1965) to production (1970) was 2.2% (nominal), which, given that inflation over the period averaged 3.5%, meant the economy was functionally shrinking 1.3% a year. This strongly suggests that a rational political actor, wanting to maintain office for as long as

possible, would not put resources or significant subsidies into a field that would cause the unemployment of its voter base.

Norway had a significantly more diversified energy infrastructure than the UK did: 19% coal, 1% natural gas, 40% hydro and 40% oil. While hydroelectric construction is labor intensive, it's one-time. One does not demand to build a new dam every year to run the same power plant as last year. Further, the civil engineering construction skills from dam building carry over relatively easily to building off-shore oil platforms. Norway's economy's growth was not keeping pace with inflation (3.1% nominal growth on average per year vs. 3.69% inflation,) the rate of contraction was less than half of that of Britain's.

In an average year between 1960 and 1978, Norway's GDP was 8.2% of the UK's, suggesting a much smaller economy – but Norwegian per capita GDP was on average 117.82% of the British per capita GDP. The population and economy of Norway was so much smaller than the economy and population of Britain that barring the deliberate development of a petrochemical industry, the demand for oil in Norway would never exceed 10% of the demand for oil in the UK. Such a small level of demand reinforces the hypothesis that when decision makers do not have to fear retaliation at the ballot box either directly by oil-consuming voters or their oil-consuming employers, the institutional designer can give way to his rent-seeking instincts.

Demand for oil in Norway stayed low, never rising to 9 MTO a year. Lacking significant domestic demand for the product, the Norwegian government was in a stronger position to pressure the producers on government participation. If domestic demand for the oil had been high, then government dominance of extraction could be seen as an effort to rent-seek from Norwegians, as opposed to Europeans. Simultaneously, the low domestic demand meant there was no strong pressure for the Norwegian government to provide the necessary public energy good of oil

to Norwegian voters and industry. Because the Norwegian government did not demand to fear retribution from voters rooted in energy policy, it was able to hold fast against oil companies who wanted to explore Norwegian waters. The low domestic demand and lower level of privatization confirms domestic demand hypothesis b.

With low domestic demand for the oil, the Norwegian government could push for a stronger role in the production process than the UK could. This would appeal to the state from a rent-seeking perspective. By participating directly in the production process through joint ventures, the Norwegian government directly accrued rents from sales of oil abroad. The diversified energy structure as well as concentration of oil use meant that Norway's discovery moved it from a net importer to net exporter of oil. Despite the relatively low prices of the period, production was still profitable: such profits could (and were) directly put into the expansion of the Norwegian welfare state. By forming state-owned and joint-state-owned ventures, the Norwegian government was able to directly intervene in the employment market of Norway in both the post-production industries of refining, trade and finance and the industries derived from oil such as construction, welding, and oil-equipment manufacture. Because the ventures were joint efforts between the Norwegian government and private industry, risks associated with potential exploration disasters (such as the Piper Alpha explosion of 1988) and economic risks associated with price volatility were shared. The Norwegian regime of moderate state participation with low international prices and low domestic demand supports confirmation of additive variable hypothesis two.

## 6. CONCLUSIONS

The wide variety in the Dutch, British and Norwegian institutions designed in reaction to the North Sea windfalls can be explained by looking to the governments' preferences, the international prices and domestic demand levels facing the three states. Of the eight potential combinations, three are evident in the North Sea. The Dutch government was interventionist and facing high international prices paired with low domestic demand. The United Kingdom's government at the time of discovery was more *laissez-faire*, and facing low international prices paired with high domestic demand. Norway's interventionist government found oil when international prices and domestic demand were low. Each government selected a level of privatization corresponding to the additive influence of the independent variables.

The center-left Dutch government reflected a cultural tendency toward intervention in the private market in order to maintain a general level of social welfare. Left on its own, the government would have preferred to dominate the entire extraction and production process. This interventionist government saw the discovery of natural gas within the Groningen seabed at a time when natural gas prices were relatively high. Absent an interventionist government, these high prices should have led to a low level of privatization, consistent with international prices hypothesis a. On the other side, however, Dutch domestic demand for natural gas at the same time was low. Taken on its own, the demand level should have also led to higher levels of government participation, consistent with domestic demand hypothesis b. In combination with the interventionist-leaning Dutch government, the institution governing getting natural gas out of the seabed favored private market actors. Once the gas was out of the ground, however, the Dutch government's dominant position in the transportation part of the production process intervened. This

results in an institution with the overwhelming control of extraction in the hands of the state.

This would confirm additive hypothesis four.

Oil prices at the time of the British discovery were relatively low. In a vacuum, these low prices would push the government to design an institution with a high level of privatization, matching international price hypothesis b. Domestic demand for oil, on the other hand, was high and climbing and spreading into a myriad of industries. Again, this should lead to high levels of privatization, tying to domestic demand hypothesis a. The institution as designed by the British government left extraction largely in the hands of the private actors. This high level of privatization is consistent with additive hypothesis three.

In Norway, prices of oil at the time of discovery were also relatively low. On its own, these high prices should have led to high levels of privatization (consistent with international price hypothesis b). Norwegian domestic demand for oil, however, was not only low but concentrated. The bulk of the state's energy demands were met by hydroelectric power and coal, and the bulk of its oil went into transportation. The domestic demand level should have led to a low level of privatization (consistent with domestic demand hypothesis b). The Norwegian government formed a state owned enterprise, Statoil, with which every firm had to form a joint venture in order to explore and extract oil from the Norwegian territory of the North Sea. The Norwegian state was a significant, but not dominant partner in extraction, producing a moderate level of privatization. This level of privatization is consistent with additive hypothesis two.

Further study is clearly warranted. As seen by the Dutch example, not only does direct ownership of the extraction process impact the balance of control, but so do the transactions associated with the process. The British example – especially once one considers the Thatcherite revolution of 1979 – demonstrates that the initial design is not the end of the story. The political expla-

nation for ring-fencing and the change of the accounting system in Britain could offer further explanatory power. The Norwegians, finally, have demonstrated that end *use* of the revenues generated by the institution matter a great deal to the institution's maintenance. Changes in international market conditions may prove critical in operation of and changes in the institutions over time. One option might be to expand the set to other industrialized, democratized states and other windfalls, such as the innovation of fracking in the US, or more efficient mechanisms of oil extraction in the Canadian tar sands. Examination of the institutions over time, and their changes will likely lead to a time-series data set that offers a predictive model that might prove critical to democratizing states with resource curses.

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