

The Lighthouse Debate and the Dynamics of Interventionism

Rosolino A. Candela¹  · Vincent J. Geloso²

Published online: 5 June 2018

© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract Coase’s publication of “The Lighthouse in Economics” (1974) sparked a polarizing debate over his claim that government intervention is not necessary for the existence of a private lighthouse market. The purpose of this paper is to reframe this debate by asking the following question: why was nationalization the outcome of lighthouse regulation? We answer this question by utilizing the Austrian theory of interventionism to illustrate how regulation of the lighthouse market distorted the entrepreneurial market process. We argue that the nationalization of the lighthouse market in England and Wales was a result of prior government failure to exclude private lighthouses from the market, not a failure of the entrepreneurial market process to privately provide lighthouses.

Keywords Entrepreneurship · Dynamics of Interventionism · Lighthouses · Regulation

JEL Classification B53 · D72 · L51

1 Introduction

The publication of Coase’s seminal paper, “The Lighthouse in Economics” (1974), has sparked a polarizing debate over his claim that government intervention is not necessary for the existence of a private lighthouse market. The debate that has ensued has

✉ Rosolino A. Candela
rosolino_candela@brown.edu

Vincent J. Geloso
VincentGeloso@hotmail.com

¹ Political Theory Project, Department of Political Science, Brown University, Box 2005, Providence, RI 02912-2005, USA

² Department of Economics, Bates College, Lewiston, ME, USA

been over the extent to which government intervention is necessary for the financing and construction of lighthouses. Though other historical examples¹ have been investigated and analyzed, the primary focal point of this debate, following Coase, has been the English and Welsh lighthouse market between the year 1514, when a seaman's guild, known as Trinity House, was chartered by King Henry VIII as the primary regulatory body for maritime safety along the Thames river, and the year 1836, when Parliament legislated the complete nationalization of the English and Welsh lighthouse market.

The purpose of this paper is to reframe this debate by asking the following question: why was nationalization the outcome of the regulatory process? We answer this question by utilizing the Austrian theory of interventionism to illustrate how regulation of the lighthouse market distorted the entrepreneurial market process. We argue that the nationalization of the lighthouse market in England and Wales was a result of prior government failure to exclude private lighthouses from the market, not a failure of the entrepreneurial market process to privately provide lighthouses.

Kirzner argued that “government regulations drastically alter and disturb opportunities for entrepreneurial gain, but they do not eliminate them” (1985: 135). The demand for government intervention tends to create new profit opportunities for private entrepreneurs that are unintended and would otherwise not exist, therefore generating unintended consequences considered undesirable to regulators. These regulators, unable to anticipate the unintended consequences of intervening in the entrepreneurial market process, will tend to demand new regulations that mitigate the unintended effects of prior interventions, generating an unstable dynamic process whereby the intervening authority must either admit failure and cease its intervention or expand its regulatory power until the entire enterprise being regulated is completely nationalized.

Applying the Austrian theory of interventionism, we explain the mechanism by which the lighthouse market ultimately became nationalized. Utilizing a combination of primary source and secondary source historical literature, we argue that the nationalization of the English and Welsh lighthouse market was an unintended, yet logical, outcome of a series of prior interventions into the lighthouse market, initially demanded by Trinity House. The series of interventions into the lighthouse market, which later created the justification for nationalization, was not predicated on a market failure associated with an inability of lighthouse owners to exclude non-payers due to free-riding. Rather, such an inefficiency was a by-product of intervention into the market process, specifically of a government failure by Trinity House to anticipate the unintended consequences of the regulation it desired. *Nationalization was not implemented to correct a market failure, but to create a failure of a private lighthouse market to exist.*

In the name of providing national defense against foreign invasion of the Thames River, Trinity House petitioned King Henry VIII to become the regulator of maritime

¹ See for example Lai, Davies, and Lorne (2008a, 2008b) on the political economy of lighthouses in China, Lindberg (2015) on the Swedish lighthouse system, and Krause (2015) on buoys and beacons in Argentina.

safety, with powers to regulate pilotage² and later establish seamarks,³ which included lighthouses. Trinity House, through several acts of Parliament, accumulated increasing prerogative over the lighthouse market in order to preserve and expand what it regarded as its prerogative in regulating the construction of lighthouses and enforcing payment of lighthouses services, whereby it excluded the possibility of private provision of lighthouses.

Though regulation was initially demanded for the intended private gain of Trinity House agents, the dynamics of intervention unleashed a series of consequences that were unanticipated and undesired by Trinity House itself. Trinity House agents, under the pretext of reducing the risk of invasion of London through the Thames, tended to restrict the construction of lighthouses in order to maximize the rents it accrued from its monopoly privilege over pilotage. The limited supply of lighthouses unintendedly created profit opportunities for private entrepreneurs that were unanticipated and undesired by Trinity House.

In order to circumvent Trinity House's regulatory powers, entrepreneurship was redirected into superfluous discovery processes, which included the acquisition of monopoly patents by lighthouse owners directly from the Crown. Fearing an intrusion into what it regarded as a monopoly privilege in establishing seamarks, Trinity House would mitigate this unanticipated and undesired consequence by becoming the exclusive leaser of patents for constructing lighthouses. The creation of such monopoly patents, in turn, created a vested interest group among lighthouse owners dependent on Trinity House's regulatory power, with both parties sharing a mutual interest in restricting the conditions of entry into the lighthouse market. Ultimately, nationalization was the logical outcome of intervention by Trinity House in an effort to use its regulatory power to protect its monopoly rents. The by-product of the dynamics of interventionism was to preclude the possibility of an unhampered private market for navigational aids, including lighthouses.

The contribution of this paper is twofold. Our primary contribution is to the existing literature on the economic analysis of lighthouses under Trinity House (Coase 1974; van Zandt 1993; Taylor 2001; Bertrand 2006, 2009, 2016a, 2016b; Barnett II and Block 2007, Block and Barnett II 2009; Allen 2012; Carnis 2013, 2014; Candela and Geloso 2017). The central focus of this literature has been over the government's role in enforcing payment and excluding non-payers of lighthouse services. What has been relatively neglected in the literature is twofold: (1) the relationship between the regulation of the market for lighting services and nationalization; and (2) an analysis of why Trinity House was established. To the extent that nationalization is discussed, it is primarily treated as an exogenous event independent of the circumstances in which Trinity House was established.

² According to Clarke, pilotage refers to “the art of taking a vessel from one place to another in sight of land and providing ships with safe passage onto rivers and harbours or through dangerous waters” (2016: 32). In the case of the Thames River, this is particularly important for our narrative because, according to Adams and Woodman, of the 210 miles flowing between its source of the Thames and the Nore, and with a sandbank at the mouth of Thames River, “only the lower 30 miles are navigable by sea-going vessels.” (2013: 35).

³ A seamark refers to an object that aids the navigation of mariners in avoiding shipwreck due to rocks, shoals, or sandbanks. Seamarks include “every kind of terrestrial object that might assist the mariner in his course. The spire of a church, the tower of a ruined castle, a windmill on a height, an isolated tree, or even a rock” were often used as seamarks (Clarke 2016: 20). Among these seamarks included buoys and beacons, the latter of which refer to a navigational aid, such as “poles set in the seabed, or on the seashore, with perhaps an old lantern affixed to the top” (Harris 1969: 153). According to Meade, lighthouses are a particular seamark that derive their name “from the fact that the illumination was in the first place exposed from an ordinary house or from some even less pretentious building. Many of the earlier shore lights were simply the usual dwellings with a lantern or some other appliance placed on the roof” (1949: 101–102).

Therefore, we contribute to this literature in three ways. First, we reframe the current lighthouse debate using the Austrian theory of interventionism. Second, by reframing the debate utilizing this theory, we recast nationalization as endogenous to the dynamics of interventionism. Third, we explain that the origins of this interventionist process can be traced to the capture of regulatory authority by Trinity House, granted to it originally by Henry VIII, for the original purpose of regulating pilotage.

Secondly, we contribute to the literature on the Austrian theory of interventionism (Mises 1926 [2011], 1940 [1998], 1949 [1966]; Kirzner 1978, 1985; Lavoie 1982; Ikeda 1997, 2005, 2015; Boettke, Coyne, and Leeson 2007). Our contribution to this literature is to provide an empirical application of the dynamics of intervention framework into an area of economic history where it has not been applied prior. Ikeda, for example, has noted that “an important agenda item is to find a useful way to integrate [Austrian Political Economy] and [Public Choice] into an internally consistent framework” (2005: 49).⁴ We do so by demonstrating that as an outcome of the dynamics of interventionism, nationalization was a political means to protect the regulatory authority of Trinity House, namely by barring entrepreneurs from crafting market solutions that would have (1) addressed market failures in the lighthouse market in an economically efficient manner and (2) rendered the regulatory authority of Trinity House unnecessary.⁵

This paper proceeds as follows. In Section 2, we reexamine and reframe the current debate on the financing and provision of lighthouses utilizing the Austrian theory of interventionism. In Section 3, we explain the historical origins of the incorporation of Trinity House as well as the organizational and regulatory foundations from which the hampered lighthouse market emerged. In Section 4, we explain how the ownership structure of the lighthouse market emerged as a consequence of prior interventions that failed to anticipate superfluous discoveries in the lighthouse market, which in turn

⁴ See also Boettke and Lopez (2002), Holcombe (2002), and Sutter (2002) who also explore this agenda as well.

⁵ Though the nature of our contribution to this literature is primarily empirical, we wish to raise and address two potential theoretical objections regarding the applicability of the dynamics of interventionism framework to explain the nationalization of the lighthouse market.

First, one might argue that our application of the Austrian account of interventionism does not hold, since Mises’s original rendition, and those extending his framework, such as Kirzner, had assumed benevolence among the proponents of intervention. However, the crucial component in Austrian political economy, and the theoretical account of interventionism in general, is the epistemic assumption of radical ignorance, or as Boettke, Leeson, and Coyne put it, “structural ignorance” (2007). In other words, though proponents of intervention may seek regulation for their own private interests, the *contextual knowledge* required to anticipate the consequences of such regulation are precluded to them, since outside the institutional context of private property rights and market prices, such beneficiaries are not full residual claimants of profit and loss signals available only in the entrepreneurial market process. Therefore, as Ikeda points out, “the assumption of public spiritedness is not an indispensable or even a defining component of [Austrian political economy]” (2005: 47). The “unintended consequences that arise from radical ignorance, and not public spiritedness per se, are the key to understanding discrepancies between (open or concealed) intentions and actual outcomes” (Ikeda 2005: 48). Thus, relaxing the benevolence assumption entails “little or no loss of methodological integrity” (Ikeda 2005: 49).

Second, one might object that Mises did not consider nationalization in the theoretical framework of interventionism, since he wrote that “[p]artial socialization of the means of production is no intervention in our sense. The concept of intervention assumes that private property is not abolished, but that it still exists in substance rather than merely in name.” For example, “[n]ationalization of a railroad constitutes no intervention” (1926 [2011]: 4). However, our application of the dynamics of interventionism, as Lavoie has pointed out, shows that the “whole thrust of Mises’s economic writings seems more consistent with the inclusion of nationalization of industries within the category of intervention into the market order” (1982: 173).

prompted Trinity House to intervene in order bar the private provision of lighthouses. The by-product of the dynamics of interventionism was the final nationalization of the lighthouse market, which we explain in Section 5. Section 6 concludes with suggestions for future research.

2 The Lighthouse Debate Reexamined

The Austrian theory of interventionism is uniquely suited to provide an excellent theoretical framework to reframe to current lighthouse debate. The economic system of interventionism, or what Mises refers to as the “hampered market economy,” is one in which the government or regulatory authority interferes with the operation of the market economy without eliminating it altogether (1949 [1966]: 718). Interventions refer to decrees, issued directly or indirectly by a regulatory authority, which forces the entrepreneurs to employ their resources and entrepreneurial effort different from the manner in which they would have done so in an unhampered market.

Such decrees interfere with the operation of the market process by “means of orders or prohibitions (such as tariffs, price controls, monopoly privileges, and other regulations)” (Mises 1949 [1966]: 718). Moreover, the decree does not necessarily have to be issued directly by the government itself, but can come from another agency or “private” entity, which is backed by *de facto* or otherwise *de jure* government force. “If the recognized government tolerates such procedures or even supports them by the employment of its governmental police apparatus, matters stand as if the government itself had acted” (Mises 1949 [1966]: 719). The central basis of interventionism, which is also the central claim around which the current lighthouse debated is centered, is that the government historically has not limited its activities to the enforcement of private property rights and voluntary contractual arrangements, in this particular case between buyers and sellers of lighthouse services.

What sparked the current debate surrounding the private provision of lighthouses was Coase’s response to the claim that government provision is necessary for the construction and financing of lighthouses, more specifically for collection and enforcement of payment. John Stuart Mill wrote that there are certain goods “in which important public services are to be performed, while there is no individual specially interested in performing them, nor would any adequate numeration naturally or spontaneously attend their performance” (Mill 1848[2004]: 887–888). Therefore, “it is the proper office of government to build and maintain lighthouses, establish buoys, etc. for the security of navigation: *for since it is impossible that the ships at sea which are benefited by a lighthouse, should be made to pay a toll on the occasion of its use, no one would build lighthouses from motives of personal interest, unless indemnified and rewarded from a compulsory levy made by the state*” (emphasis added, Mill 1848[2004]: 888).

Coase challenged this notion held by Mill, and later continued by Henry Sidgwick, Arthur Pigou, and Paul Samuelson, arguing that the role of government with respect to lighthouses is no different than that of other goods. Citing the historical case of England and Wales prior to 1836, Coase argued:

The early history shows that, contrary to the belief of many economists, a lighthouse service can be provided by private enterprise. In those days, shipowners and

shippers could petition the Crown to allow a private individual to construct a lighthouse and to levy a (specified) toll on ships benefitting from it. The lighthouses were built, operated, financed and owned by private individuals, who could sell the lighthouse or dispose of it by bequest. *The role of the government was limited to the establishment and enforcement of property rights in the lighthouse. The charges were collected at the ports by agents for the lighthouses.*⁶ The problem of enforcement was no different for them than for other suppliers of goods and services to the shipowner. *The property rights were unusual only in that they stipulated the price that could be charged* (emphasis added, Coase 1974: 375).

Although excludability of lighthouses was tied to the use of ports, where private agents of lighthouse owners collected fees for lighthouse services, known as “light dues,” the claim, first made by van Zandt (1993), is that this could not occur without government intervention. For example, van Zandt writes that in “almost every case, the government did much more. It granted the lighthouse owner a monopoly on the provision of lighthouse services at a particular location; it set and enforced a fixed schedule of ‘light dues’; and it assisted the lighthouse operator in collecting his light dues against non-consenting ship captains” (1993: 56; see also Harris 1969: 176–177).

Therefore, van Zandt argues that there are “no examples of lighthouses operating in the ‘pristine’ world...in which the government only protected property entitlement and enforced consensual deals” (1993: 56) since “there were no practical – that is, cost effective – ways for a passing ship and a lighthouse proprietor to communicate to form a contract before the fact” (1993: 56). Reinforcing van Zandt’s point, Bertrand also states that the “King even helped the lighthouse ‘owners’ to collect their dues, if necessary with fines or prison sentences immediately imposed on shipowners” (Bertrand 2006: 397). Like van Zandt, she goes so far as to claim that for-profit lighthouses with a minimal State role did not exist (Bertrand 2009: 17).

Barnett II and Block (2007) and Block and Barnett II (2009) have taken issue with some of the details of both Bertrand and van Zandt’s critique of Coase. For example, they “suggest that *there could well have been* lighthouse services.” They treat the debate over the private provision of lighthouses as a “*theoretical question, calling for an analysis of a counterfactual situation.*” However, they ultimately concur with van Zandt’s and Bertrand’s critique of Coase, stating that this question “*cannot be settled by the historical record*” (emphasis original, Block and Barnett 2009: 3), since a compulsory levy on lighthouse services is consistent with an interventionist market, and “not compatible with the free enterprise system, which is predicated upon *voluntary payments* (emphasis original, Block and Barnett II 2009: 2).

⁶ Other sources point to this fact of port collection lighthouse service fees, known as “light dues,” out as well. For example, Meade states the following: “It has frequently been asked how the lighthouses and the various systems of light-vessels, buoys, and beacons were paid for. . . . In the early days, when the business was in many places in private hands, the means of collecting dues had of course to be carried out by an agent at a seaport. One could not expect the lighthouse-keepers to go out on a boat and collect a toll as in the case of a turnpike road on land. It meant that the owners of lighthouses would have the additional expense of paying their agents, which naturally ultimately fell upon the shipman (1949: 114).

More recently, James Taylor has similarly written that light dues “were collected by private agents working on behalf of the lighthouse owner, or sometimes by customs officials working for a fee, from the masters of ships when they reached harbor: it was known from the route the ship took which lights it had made use of” (2001: 752–753).

Our main contribution to this literature is not to directly settle the question of private provision, which we tackle in more detail in another paper (Candela and Geloso 2017), where we illustrate that the private provision of lighthouse services absent state support *did actually exist*. Though we discuss this historical example in Section 4, this is not our main point per se. Rather, using this historical example, our main goal here is to redirect the lighthouse debate away from the central focus on an alleged “market failure” associated with privately providing lighthouse services and towards the question of how and why nationalization emerged out of government intervention, which we argue was for the purpose of excluding the possibility of a private provision of lighthouses.

To some extent, the debate has already begun to move in this direction. Both Lindberg (2013) and Carnis (2013) have already considered the question of nationalization. As Lindberg has put it, there are “a number of unresolved issues concerning the provision of lighthouse services in England that were in place prior the nationalization of 1836” (2013: 542). These issues, Lindberg goes further to state, are the following:

If the “private” system was as advantageous as Coase claimed (relative to direct provision by the government), why was it abandoned? There is no reason why excessive dues alone would have led to nationalization: the government could simply have renegotiated the terms of the patent when these ran out...If the “private” system was dysfunctional, as Bertrand and Taylor claimed, why, then, was it not abandoned earlier, much less chosen at all? (2013: 542).

Lindberg seems to defend the stability of the “public-private” system under Trinity House by suggesting that Trinity House’s “conservatism” in establishing lighthouses “makes perfect sense if one takes into account the large amount of money needed to construct lighthouses and the variability of the rewards. In some cases, lighthouse owners could only count on voluntary contributions” (Lindberg 2013: 553). Given a presumed market failure due to an inability to exclude non-payers, Lindberg seems to regard the patent system as necessary. However, Lindberg argues that this system was ultimately abandoned because the prohibitively high costs and “unmanageability” of renegotiating a growing number of lighthouses patents that would have arisen to meet the demand of increasing merchant traffic throughout the nineteenth century (Lindberg 2013: 549, 553–554).

Bertrand has reinforced this point more succinctly by stating that “these ‘private’ lighthouses ended in failure and required centralisation” (2006: 401). Block and Barnett II, however, have countered this point, stating that government intervention created its own failures, such that “every intervention has undesirable consequences that the political class understands as necessitating yet more intervention” (2009: 11). Though we agree with Block and Barnett II, they do not discuss the historical origins of intervention into the lighthouse market.

Carnis more precisely focuses on the point we are trying to examine in this paper, that “what must be considered, then is not whether private production of lighthouse services is possible, but why the government gave to private entrepreneurs the possibility of intervening in the sector of lighthouse services” in the first place (2013: 53). His argument, unlike Lindberg and Bertrand, though consistent with Block and Barnett II, points to a government failure, namely because the “patent system was clearly shaped for avoiding private good provision within a competitive system” (Carnis 2013: 53).

To the extent that Lindberg and Carnis raise the same fundamental issues we are raising in this paper, where they differ from our account is that they treat nationalization as a by-product of the monopoly patent system under the English and Welsh lighthouse system. Though this perspective is not false per se, we consider the creation of monopoly patents in ownership of lighthouses only a *proximate* cause of nationalization, which misses a more fundamental point of explaining why such a system arose in the first place. By taking this system of ownership as given, not only Carnis and Lindberg, but also other scholars in this debate have neglected to explain the *fundamental* cause of the nationalization of lighthouses, namely an initial intervention based on regulatory capture (Stigler 1971) by Trinity House, for the purpose of monopolizing pilotage on the Thames River.

By explaining that not only the monopoly patent system, but also the ultimate nationalization of lighthouses, were endogenous, or an unintended by-product, of a series of prior interventions to mitigate a set of unintended and undesirable consequences that Trinity House could not possibly have anticipated when it petitioned for its original charter, we also hope to add a fresh perspective over the possibility or impossibility of private lighthouse provision.

3 Trinity House: Historical Origins and Organizational Structure

“The free market,” according to Kirzner, “is characterized most distinctively, for our purpose, *by freedom of entrepreneurial entry*” (emphasis original, 1985: 29). Private ownership of resources and free pricing is a necessary institutional prerequisite to produce the contextual knowledge required to facilitate a tendency towards an efficient allocation of resources. The distinguishing role of the entrepreneur in the market process is to catalyze such knowledge through their alertness to previously unnoticed opportunities for pure profit. Incentivized by the lure of pure profit and the discipline of expected loss, entrepreneurs facilitate an equilibrating process by discovering opportunities, the by-product of which is to erode efficiencies in the market process by exploiting unnoticed gains from trade. From a market process perspective, an existing efficiency today represents a future profit opportunity for detecting and correcting such errors.

Moreover, such entrepreneurial decisions are not completely random, but are shaped by the underlying institutional reward structure of the market. Given the contextual nature of knowledge, however, what will constitute knowledge and what entrepreneurs will be incentivized to discover will depend upon the institutional setting. As Kirzner states, “*human beings tend to notice that which is in their interest to notice*” (emphasis original, 1985: 28).

However, intervention into the unhampered market process generates a series of interventionist dynamics, which be roughly divided into three phases, corresponding to a specific decision node that is faced by regulators. The first phase, which is illustrated in Section 3.1 and 3.2, focuses on the initial intervention, such as licensing and price controls. The demand for regulation is based upon the presumption that “unsatisfactory conditions will never be corrected unless by deliberate intervention” (Kirzner 1985: 138). However, such “unsatisfactory conditions,” as in the historical case of this paper, present a political profit opportunity for entrepreneurs, acting as a special-interest group, to demand regulation for their private benefit, namely through lobbying and petitioning.

Ikeda states that “as just radical ignorance is the starting point of the market process, so it is also the starting point of the theory of interventionism” (2005: 35). Given the presence of radical ignorance, however, regulators operating outside the context of exchangeable private property rights will be unable to replicate the error-correcting tendency of the market process, since the knowledge required for such error detection is defined only within an institutional context of transferable private property. The regulators are precluded from the knowledge available to entrepreneurs in the market process because they are “institutionally precluded from capturing pecuniary profits in the market,” even though they are as profit-motivated as anyone else (Kirzner 1985: 140). However desirable the initial intervention may be to the proponents of intervention, even if demanded for their private benefit, regulators will never be able to mimic the entrepreneurial market process. Therefore, as we discuss below, Trinity House agents will never be able to fully anticipate the undesired profit opportunities that arise unintentionally from such regulation within the hampered market process.

3.1 The Origins of Trinity House: King’s Henry VIII’s Charter of 1514

Today, Trinity House is a nominally private, non-profit organization that acts as the General Lighthouse Authority for England, Wales, the Channel Islands, and Gibraltar. Prior to its incorporation by charter from Henry VIII on May 20th 1514 (Cotton 1818: 161; Ruddock 1950: 463; Clarke 2016: 28), Trinity House was a seaman’s guild whose primary purpose was the provision of pensions and relief to mariners and their dependents, and after its incorporation, increasing preoccupation with the provision of seamarks. Ostensibly to finance their charitable activities, they were gradually provided important privileges – initially regulatory power to control access to the craft of pilotage, and later a monopoly on seamarks and the provision of ballastage⁷ on the Thames River as well as the acquisition of a formalized monopoly on pilotage.⁸

The historical circumstances⁹ surrounding the official incorporation of Trinity House as a government-mandated maritime authority, however, point to an alleged market

⁷ Ballastage refers to “a toll paid for the privilege of taking ballast” (Meade 1949: 173). The purpose of providing ballast, i.e. additional weight, at the bottom of an empty ship is to stabilize it. For example, Trinity House supplied ballast in the form of gravel or sand dredged from the Thames, which in turn was intended to keep it navigable in shallow parts of the river, such as sandbanks (Harris 1969: 127).

⁸ Tran (2003) notes that pilots had to be members of Trinity House, but it was possible – as late as 1808 – to be a pilot without being a member of the Trinity House in London. As will be seen below, there were some exceptions that created pockets of competition which Trinity House fought hard to quash. However, these were minor exceptions and Tran (2003) is correct – from the standpoint of economic logic – to consider Trinity House’s regulatory power as the equivalent of a monopoly. For the all-important Thames River, the 1604 charter granted by King James I made pilotage compulsory and gave Trinity House the exclusive right to license pilots.

⁹ According to the secondary source literature on the history of Trinity House, due to the Great Fire of London in 1666, and particularly another fire at Trinity House in 1714 (Meade 1949: 5; Ruddock 1950: 458; Tanner 1929: 573), many primary source documents were unfortunately destroyed. Records of many primary source documents prior to 1714, however, were fortunately recopied by Samuel Pepys, who was first made the Master of Trinity House on May 22nd, 1676 (Meade 1949: 52). Ruddock states that Pepys “had a number of the chief documents copied for the compilation of his projected history” (1950: 459). Although never recorded, the transcripts of documents which would have been used for this historical project are currently stored at the Pepys Library of Magdalene College, Cambridge, England (Harris 1969: 6).

failure associated with provision of national defense as well as safe navigation of the Thames River. According to petitioners from Trinity House, Henry VIII's war with France (1512–1514) had drawn most skilled seaman into service with the royal fleet, resulting in a lack of trained seaman to pilot the Thames River. On this basis, it was argued that a lack of regulatory oversight for untrained seaman would imperil the lives of other mariners. More importantly, an additional claim was made – “and this was a potent argument in times of war – the present state of affairs allowed foreigners to learn the secrets of the channels and approaches to the Port of London” (Harris 1969: 19; see also Adams and Woodman 2013: 15). The allegedly unsafe conditions of navigating the Thames River created a justificatory basis from which Trinity House agents petitioned Henry VIII, on March 19, 1513 (Ruddock 1950: 460) for a charter to regulate the Thames River. Table 1 below provides a timeline of events and important decrees, which we will discuss and follow chronologically throughout this paper.

The specific aim of the charter was not only to organize and maintain almshouses at Deptford,¹⁰ a charitable activity which dates back prior to its incorporation, but also, more importantly, to control access to the market for pilotage on the Thames River (Ruddock 1950: 464). The charter required that only pilots licensed by Trinity House were allowed to enter and exit the Thames, “with power to fine or imprison unlicensed Masters or Pilots at discretion” (Cotton 1818: 31). Further explaining this point, Joseph Cotton, who had served as a Deputy-Master of Trinity House during the early nineteenth century, writes:

Tradition has handed down an account of dues paid by foreign vessels, under different designations, which originated, as is supposed, for it cannot be at all traced, in some compact between the owners of foreign vessels and the then existing society of Pilots, for having Loadmen¹¹ waiting for them, *on their arrival at the entrance of the river*, where they had been accustomed before to remain until pilots were sent to them from Deptford, or elsewhere (emphasis original, Cotton 1818: 57).

In order to set a precedent of authority over merchant vessels that refused to employ pilots licensed by Trinity House, Sir Thomas Spert – then the Master of Trinity House – invoked the assistance of the Admiralty court “against all who resisted its claims, and would not decay, as its medieval predecessor had apparently decayed, for lack of official support against unlicensed interlopers” (Ruddock 1950: 467). By acting as an agent of the King, Trinity House was able to secure the privilege to control entry, the basis of which it would later use to justify the regulation of not only ballastage, but more importantly seamarks throughout England and Wales on the grounds of securing safe navigation of his Majesty's shores.

To secure and increase its rent from pilotage, Trinity House would systematically push for stronger, broader monopoly rights that extended to other areas of activity. For example, on the grounds of providing safe guidance of its pilots, Trinity House was later empowered by the Seamarks Act of 1566, which Parliament enacted to authorize Trinity House to erect not only buoys and beacons, but also lighthouses. On June 11, 1594, the Seamarks Act was extended to include ballastage along the Thames River (Harris 1969: 131).

¹⁰ Deptford is where Trinity House was located until 1660, at which time it moved to London.

¹¹ Loadman, or “lodesmanage,” was the vernacular used at the time for pilots, or pilotage, respectively.

Table 1 Major Decrees and Events of the English and Welsh Lighthouse System: (1513–1842)

Dates	Decrees and Other Events
19 March 1513	Trinity House agents petition Henry VIII for authority to regulate pilotage along the Thames River
20 May 1514	Letters Patent were granted to Trinity House for regulating pilotage
1566	An Act of Parliament grants Trinity House the authority to erect seamarks
11 June 1594	Letters Patent were granted to Trinity House for monopoly privilege of providing ballastage
1679	Trinity House adopts a policy of renting letters patent to private operators. After 1679, all new patents are obtained by Trinity House
4 July 1730	David Avery and Robert Hamblin secure a 14-year patent for the Nore lightship
10 October 1731	The Nore lightship goes into operation
29 November 1731	Trinity House petitions the Crown for the revocation of the Avery and Hamblin's patent of invention, arguing that the lightship constituted a breach of its monopoly privileges to collect light dues
4 May 1732	Avery and Hamblin's patent is revoked by the Crown
27 October 1733	In exchange for £100 per year, Trinity House agreed to let Avery continue to operate the lightship at the Nore for 61 years (Avery buys out Hamblin)
1834	Select Committee of the House of Commons of 1834 formed to investigate the lighthouse system
13 August 1836	Act of Parliament passed authorizing the nationalization of lighthouses and their placement under Trinity House as the sole lighthouse authority in England and Wales
1842	The nationalization process complete

Sources: (Coase 1974: 367; Hamblin 1731; Harris 1969: 131; House of Commons 1834; National Archives. PC 1/5/3, National Archives SP 36/17/81; Price 1906: 144; Ruddock 1950: 460, 463; Raithby 1823: 33; Stevenson 1959: 139, 257; Redman 1843: 35; Bertrand 2006: 400).

The original justification for the incorporation of Trinity House with monopoly privileges on pilotage, which later extended to the provision of ballastage and seamarks, was predicated on a presumed market failure in the provision of national defense. Government intervention, however, also presumes that Trinity House agents had the knowledge to correct inefficiencies that existed as previously unnoticed errors in the market process. Such unnoticed errors, as Kirzner stresses, present future profit opportunities for entrepreneurs who are alert to the opportunity to correct such inefficiencies. However, as Kirzner asks, “how will government officials *discover* those opportunities for improving the allocation of resources, which one cannot assume to be automatically known to them at the outset of a regulatory endeavor?” (emphasis original, 1985: 140) The inability to mimic the market process requires more explanation into the organizational structure of Trinity House, which we present in Section 3.2.

3.2 The Organizational and Regulatory Structure of the Trinity House System: 1514–1594

Though Trinity House is a nominally private organization, as we discussed in Section 3.1, as a non-profit organization, its governing body lacked residual

claimancy in its decision-making. According to its original constitution, Trinity House consisted of one Master, four Wardens, and eight assistants, totaling 13 individuals who served as the primary decision-makers of Trinity House. It later expanded from 13 to 31 individuals through a charter granted by King James I in 1604 (Clarke 2016: 30). The additional 18 individuals are referred to as Elder Brethren, whose role was to serve as deputies to the Master, Wardens, and assistants, though they had no direct power in the governing of Trinity House except in absence of the individual for whom they are serving as deputy. Besides the Elder Brethren, there were individuals, known as Younger Brethren, who were admitted solely for the purposes of voting in the elections of the Master, Wardens, and Elder Brethren (Meade 1949: 38–45).

Two organizational features of Trinity House would preclude its ability to mimic the market process. First, though its governing body was tasked with the responsibilities of regulating pilotage, ballastage, and seamarks, Trinity House members did not acquire shares of ownership that could be directly bought or sold to other individuals (Alchian 1965). In effect, none of the members directly accrued monetary profits from directing the allocation of pilots, ballasts, or seamarks according to consumer preferences. Rather, any profits were to be expended within the organization, ostensibly for monitoring the quality and maintenance of seamarks (Alchian and Demsetz 1972).

Second, as Harris points out, the “provision of new seamarks cost money, and the Brethren had to meet the cost out of their own resources” (Harris 1969: 160). The point here is that lacking residual claimancy over profits directly accrued from seamarks or losses sustained from shipwrecks, Trinity House regulators were precluded from responding to any information signals in the form of pecuniary profits or losses in response to changing market conditions. The additional responsibility of regulating seamarks, however, meant that Trinity House was not only tasked with keeping the Thames River safe from foreign invasion, but also safe from shipwreck. Though seemingly part of the same end – the provision of safe navigation – Trinity House, as we shall see, would face a problem of economic calculation of allocating scarce human and physical capital among competing ends. Precluded from the profits and loss signals to construct and establish lighthouses in an economically efficient manner, Trinity House agents instead acted on political knowledge that was available to them, specifically to adopt a policy that protected the rents accrued through a monopoly on pilotage.¹²

One claim often cited in the historical literature on Trinity House, though rarely emphasized in the economic analysis of the English lighting market, is that Trinity House justified its inactivity on the basis that the construction of lighthouses came at the cost of providing national defense, since light emitted from lighthouses and other seamarks would benefit enemy ships attempting to attack London during wartime (Trinity House 1732a: 1; Harris 1969: 214). Refusing to construct seamarks such as buoys, beacons, and lighthouses in the name of the public interest, however, came at the cost of preventing shipwrecks. Fewer lighthouses would

¹² As Boettke, Coyne, and Leeson argue, “Policies may in fact be adopted for very sensible political reasons that reflect political efficiency, but they can simultaneously deviate significantly from efficiency-enhancing economic policies that would be adopted if politics were able to operate on economic criteria” (2007: 138).

increase the risks inherent to navigating into the mouth of the Thames River, particularly where many sandbanks made entry to the river dangerous.

It is clear that Trinity House had a vested interest in protecting the monopoly rents accrued from the provision of pilotage, for which Trinity House would extend its regulatory power over seamarks.¹³ The monopolization of seamarks, therefore, was a means to prevent third parties from attempting to provide a substitute that could dissipate the gains of its monopoly power in pilotage.

Though many prerogatives were granted to Trinity House for the ostensible purpose of securing national defense, the granting of monopoly privileges also distorted the entrepreneurial market process by preventing possibility for entrepreneurs to discover other ways to innovate, namely by bundling goods in a manner that would reduce costs (Demsetz 1970; Liebowitz and Margolis 2011; Bakos and Brynjolfsson 1999). The intuition of economists vis-a-vis lighthouses and other seamarks has been that it was the only component which provided maritime safety. This is not the case, since the lighthouse is merely *one* of many ways to provide maritime safety. Shipowners faced many risks that could have induced a wreck. For example, ships gain stability as their cargo increases, which means that ships without ballast could be quite unstable. This is why the act of filling the low portions of a ship in ballast with sand was considered a crucial element of maritime safety.

However much the excludability of lighthouses has been debated, ballastage is clearly an excludable service. If one bundles a public good with a private good, one can “price in” potential users (Bakos and Brynjolfsson 1999). In fact, this is an easier task if the different goods and services are complements to the same end. In this case, ballastage is a complement to lighthouses when viewed in the wider perspective of maritime safety, much in the same manner that lighthouses are complements to the local pilots who board foreign ships to guide them in unfamiliar waters or how insurance providers often mandate proof of payments to certain services in order to reduce risks and premiums charged. However, in the case of England’s maritime safety market, this possibility was blocked by the actions of Trinity House. In so doing it blocked the option to bundle these two complementary goods together.

There is no way of knowing how the entrepreneurial market process would have evolved were it not distorted by regulation, but it is clear that Trinity House’s regulatory authority prevented entrepreneurial entry within the broader market for navigational aids, as well as “competition for the field” of other potential providers of lighting services (Demsetz 1968: 57, fn. 7). For example, pilots accredited in the Cinque Ports (Hasting, New Romney, Hythe, Dover and Sandwich) and the Island of Thanet were regulated under a “Society of Trinity House” which was originally independent from the Trinity House of London. The former held regulatory authority over this small area while the latter regulated the Thames River, some 40 seaports and the Channel itself. Though each had monopolized the regulation of pilotage in their respective areas, there remained limited scope for competition between the two authorities and some pilots

¹³ Incidentally, it is worth highlighting that pilotage as a substitute to the lighthouse, which historians such as Adams and Woodman (2013: 36) describe in terms that make it a perfect substitute, entail that the lighthouse may have been too hastily categorized as a public good.

from the Cinque Ports did compete with those along the Thames (Tran 2003). However Trinity House of London gradually extended its authority outside the Thames River, prohibiting non-accredited pilots from providing services to prospective consumers (Trinity House 1732a: 1–2). What had prevailed *de facto* by Henry VIII's original charter in 1514 on the Thames River was later confirmed *de jure* in 1808 with the *Act for Maritime Pilotage*, which conferred a full monopoly to Trinity House over pilotage across the country (Tran 2003).

A similar logic applies in the case of ballastage, “the most contentious” (Adams and Woodman 2013: 99) of the Trinity House's activities. In fact, the conferment of the monopoly over ballastage was justified on the basis of bundling the provision of seamarks and ballastage together.¹⁴ The revenues for the latter were meant to finance the former. There are clear acknowledgments that the two were complements that could be bundled (Adams and Woodman 2013: 99–104). Trinity House itself made this point when the *Ballast Act* of 1732 was debated, asserting that without control over ballastage, “Navigation on the River Thames would soon be ruined” (1732b: 3).

This prohibition of competition in pilotage and ballastage implied the *de facto* prohibition of bundling certain goods and services to create private exclusionary mechanisms by private providers. The exercise of Trinity House's regulatory authority in the face of somewhat limited competition should be indicative of the extent to which entrepreneurs were blocked from their attempts to seize entrepreneurial profit opportunities. As such, Trinity House's control over these activities limited potential entrepreneurs to the tools of social ostracism (Kingston 2007), exclusionary pre-payments (Brubaker 1975) and cost-reducing innovations (Candela and Geloso 2017). Potential tools of industrial organization were precluded by the structure of the monopolies given by Trinity House.

4 The Hampered Lighthouse Market under Trinity House

Whereas the existence of market failures, as Boettke, Coyne, and Leeson write, “spur entrepreneurial discovery so that wealth-enhancing exchanges are continuously being brokered, the existence of economically inefficient (wealth destroying) policies does not automatically yield political ‘profits’ for politicians to grab” (2007: 141). In a market economy hampered by price controls, regulations, and other interventions, “the constant effort to capture pure entrepreneurial gain keeps the market in perpetual motion” (Kirzner 1985: 135), though towards outcomes that regulators may not have intended or desired.

This brings us to the second phase of the dynamics of interventionism, which we illustrate in Section 4.1 and 4.2, focusing on how intervention impinges on the system external to the initial intervention. In a regulatory environment in which the proponents of intervention, even one in which political actors are not benevolent, demand regulation for their private concentrated benefit, such intervention will nevertheless produce

¹⁴ As Adams and Woodman (emphasis added, 2013: 99) point out: “The monopoly on dredging and selling ballast by which Trinity House was *originally supposed to raise funds to provide seamarks* was, of all the Brethren's activities, the most contentious.”

economic inefficiencies in the form of social costs external to the political exchange between political officials and beneficiaries of regulation. Precluded from profit and loss signals that are contextual to the market process, the knowledge required for the correction of such inefficiencies will be absent to proponents of intervention.

Regulation redirects entrepreneurs “to alternative possibilities that generate an entirely different pattern of consequences than what would appear in the unregulated market economy” (Boettke, Coyne, and Leeson 2007: 131). As a result, such intervention will redirect entrepreneurs to notice profit opportunities previously not in their interest to notice. The generation of such inefficiencies by political intervention, therefore, represent superfluous profit opportunities that would otherwise not have existed in the market process. Compared to an unhampered market, such entrepreneurship will be socially unproductive, since resources and effort are expended to circumvent regulation. However, given the existence of such intervention, such superfluous discovery may be productive, namely by eradicating the existing inefficiencies created by regulation (Lucas and Fuller 2017).

The by-product of this superfluous discovery process, however, will also be an erosion of the rents that special interest groups derive from the existing regulation. Such an outcome, however, will be undesirable. Therefore, regulators will be incentivized to produce another round of intervention to mitigate this unintended consequence. This is because if the proponents accept this outcome, the monopoly rents derived from regulation will be eroded. Such an outcome, however, will be a concentrated cost on the beneficiaries of existing regulation, the benefits of which will be dispersed on society.

Precluded from an institutional context of private property, and therefore residual claimancy, over these dispersed benefits, the entrepreneurial incentive and economic knowledge embodied in such profit opportunities will be absent to regulators. Instead, proponents of intervention will acquire and identify knowledge that is available to them in the political setting. That is, they will be “alert” to political knowledge that is consistent with preserving their monopoly privilege: lobbying for new interventions to correct for the failure to foresee the undesirable consequences of prior interventions, namely consequences that threaten the benefits derived from regulation (see Wagner 1989: 51–57).

4.1 The Origins of the Property Rights Structure in Lighthouses: 1566–1679

Though the Crown had chartered Trinity House with the task of regulating pilotage in 1514, Trinity House’s authority to regulate lighthouses did not occur without ambiguity. In the beginning of the sixteenth century, the Lord High Admiral, or the head of the Royal Navy, was originally responsible for the regulation of seamarks (Harris 1969: 154). As we mentioned briefly in Section 3.1, “[r]egular users of the [Thames] river as they were, the masters of Trinity Houses had a strong interest in the maintenance of an adequate system of buoys and beacons for the Thames” for the safe guidance of its pilots (Harris 1969: 155).

Parliament legislated *An Act touching Sea Marks and Mariners* in 1566, which granted Trinity House the right to, “*at their Costs, make, erect, and set up such and so many Beacons, Marks, and Signs for the Sea,*” (emphasis added, Raithby 1823: 33). As Harris states, there “was real doubt about the right of the Brethren [Trinity House],

under the Act of 1566, to lay buoys and beacons in the water itself” (Harris 1969: 159). After the power to erect buoys was finally confirmed in 1594 by Act of Parliament (Stevenson 1959: 254), there remained a more important issue about the definition and enforcement of property rights over lighthouses.

Though the Act of 1566 was the legal basis from which Trinity House would claim its authority in regulating lighthouses, and control the conditions of entry and exit into the lighthouse market, two points that are important for our argument must be mentioned here. First, the word “lighthouse”¹⁵ is not mentioned in the document itself. Second, the document itself does not indicate that Trinity House was given any authority to charge dues on shipping for constructing and maintaining lighthouses. Failing to anticipate the increased commercial demand for lighthouses that would grow throughout the seventeenth century, Trinity House agents engaged in a legal battle with the Crown, claiming that the power to erect beacons and seamarks extended also to the construction and regulation of lighthouses.

Though Trinity House sought to control the lighthouse market, given the lack of full residual claimancy in its organizational structure, in which the costs of establishing seamarks were concentrated on Trinity House agents, and profits were dispersed within the organization itself, meant that Trinity House agents lacked both the knowledge and incentives embodied in profit and loss signals to build lighthouses in an economically efficient manner. According to Harris, “there were very few lighthouses on the English coast in the sixteenth century, and they did not exist in significant numbers until after 1700” (1969: 153). By 1609 only four lighthouses had been built by Trinity House (Clarke 2016: 30), and none between 1610 and 1675 (Stevenson 1959: 259; Coase 1974: 364; Bertrand 2006: 394).

Precluded from capturing entrepreneurial profits through the market process, Trinity House instead tried to preserve the rents it derived from its monopoly privilege in pilotage by preventing private individuals from building lighthouses, specifically by denying the petitions brought forth by individuals (Stevenson 1959: 259). The result of Trinity House’s intervention into the lighthouse market, and its legal battle with the Crown, was the unintended emergence of superfluous profit opportunities, which manifested itself in the creation of patents, through which entrepreneurs leased the right to construct and operate a private lighthouse. In order to circumvent the regulatory authority of Trinity House, private entrepreneurs alert to the demands of ship owners and mariners would apply for a patent directly from the Crown, empowering them to construct lighthouses and levy light dues on ships, which were collected at ports (Coase 1974: 364). In exchange for such patents or leases, private individuals paid rents to the King for the privilege (Bertrand 2006: 395; Meade 1949: 114–115; Taylor 2001: 752).

The case of the Winterton light in the county of Norfolk, England best illustrates the manifestation of this superfluous profit opportunity. In February 1614, roughly three hundred shipowners and mariners petitioned Trinity House to establish lights on the steeple of Winterton Church, but to no avail. Trinity House’s delay prompted Sir William Erskine to circumvent Trinity House and petition for a patent directly from

¹⁵ Nor is the word *phari* ever written. According to Stevenson (1959: 254), the term *phari* was not yet displaced by the word *lighthouse* at the time in which the act was written, the former term being derived from the ancient light tower constructed in 285 B.C., the Pharos of Alexandria, in Egypt (see Meade 1949: 101, fn. 1; Stevenson 1959: 8).

King James I himself. This patent was later granted on February 18, 1618 in the names of Sir William Erskine and Sir John Meldrum, the latter having broached Erskine in obtaining the patent for a share of the profits (Harris 1969: 196).

Trinity House objected to this grant, given that two years prior, it had been consulted by Daniel Dun, the Judge of the Admiralty Court, about building a lighthouse at Winterton (Harris 1969: 191; Stevenson 1959: 196). The legal rationale behind the grant of this patent, according to the King's Attorney General, Sir Henry Yelverton, was the Act of 1566 bestowed upon Trinity House the right to erect lighthouses, but "insisted that this did not prevent the King from taking steps to ensure that lighthouses were provided, if the Brethren neglected their duty" (Harris 1969: 195).

During the 1610–1675 period, in which Trinity House built no lighthouses, Coase reports that at least 10 lighthouses were built by private individuals (Coase 1974: 364), while Stevenson puts the figure at 12, 11 of which were Crown patents and 1 being from the Lord High Admiral, although the latter was an exception to the patent granting procedure (Stevenson 1959: 259).

Given the prevailing regulatory constraints, such a legal loophole allowed a greater scope for market competition in the lighthouse market than would have otherwise existed. Nevertheless, additional regulations built into the patent system interfered with free pricing of light dues.

The patent system interfered in the pricing mechanism of lighting services, namely by directly fixing the price that lighthouse and lightship owners could charge. When patents were issued by Trinity House, or directly from the Crown, for operating a lighthouse, it stipulated the light dues that could be charged to ships. Rather than being flexible to changing market conditions, rates charged to ships were fixed by government decree. For example, in 1768, out of 37 lighthouses and lightships reported (Anonymous 1768: 17–18), only three discriminated by tonnage categories (Anonymous 1768: 22–24)¹⁶ while the others offered flat rates per ton or per ship (the only exceptions were foreign ships, which were charged double). The inability to price discriminate created inefficiencies, particularly by leaving potential gains from trade unrealized.

Moreover, owners of lighthouses and lightships were required to pay Customs officials for the collection of light dues. Custom officials would often employ their own agents to outsource the collection of light dues across different ports, from which these quasi-private agents would be paid a percentage commission for collection, "as much as 20–25 percent in the period up to the mid-19th century" (Nicholson 1983 [1995]: 13). Such collection costs were not negligible: according to the 1834 report of the House of Commons, expenses for the collection of light dues represented 17.4% of all expenses in 1820 and 25.4% in 1832 (1834: 412). In fact, it was on this basis that the 1834 report called for the nationalization of all lighthouses in England and Wales, namely to eliminate an unintended consequence of regulation by Trinity House, which was monopoly power created by the issuance of patents. Suffice it to say, the lighthouse patent system, characterized by price fixing and government collection of light dues,

¹⁶ And this included the lightship at the Nore which had, by that time, passed into the hands of Trinity House. It is probably a vestige of Avery and Hamblin's experiment as it was one of the last establishments that practiced price discrimination in 1832 (House of Commons 1834: 341). The other lighthouses were private lighthouses and their discrimination was based on increments of 100 tons.

introduced market inefficiencies that would only create further superfluous profit opportunities.

4.2 Lighthouses, Lightships, and Further Intervention by Trinity House: 1679–1836

Carnis writes that “the institutional evolution of production of lighthouse services reflected a generalized movement of intervention in the economy and redistribution of property rights” (2013: 55). With an expansion in the volume of trade throughout 17th and 18th centuries, the value of owning lighthouses increased, creating competition for patents to erect lights.

As a result, beginning in 1679 (Stevenson 1959: 257), Trinity House shifted its policy away from direct competition with the King in the lighthouse market to one of cooperation, so as to control the distribution of lighthouse patents and therefore effectively control the conditions of entry and exit. Rather than individual petitioners lobbying the King for a patent, Trinity House sought to consolidate its monopoly privilege – derived from the Act of 1566 – namely by applying itself for a patent from the King to operate a lighthouse. Such patents, held by Trinity House, would then be leased to individuals seeking to erect lighthouses, for which they would pay a rent to Trinity House for the privilege and bear the costs of construction. As Coase states, the “advantage to a private individual of such a procedure would be that he would secure the co-operation rather than the opposition of Trinity House” (1974: 365).

In effect, since they lacked the incentives and knowledge to monetarily benefit from producing lighthouses in the most cost-effective way, Trinity House agents instead monetized their political privilege by requiring prospective lighthouse owners to apply for patents of ownership, entitling Trinity House agents to a portion of the fees collected in exchange for enforcing payment. Given Trinity House’s discretion over the entry and exit conditions of this hampered lighthouse market, it effectively became a monopoly seller of patents, backed by the power of the King.

Given the non-profit organizational structure of Trinity House, however, the income stream from such patents was attenuated, since no residual claimant directly accrued the rents derived from such patents as monetary income. It is no surprise then that Trinity House officials would indirectly monetize their monopoly control over such patents through direct purchase of leases in the lighthouses themselves. For example, as Adams and Woodman state, “several lighthouse leases were being taken up by members of Trinity House itself. John Whormby, the Corporation’s clerk until 1750, was part of a syndicate having shares in the Eddystone.¹⁷ This also included his predecessor Samuel Hunter, the deputy clerks and Collectors of the Light Dues at London, John and Richard Noyes, and Thomas Day, the Collector of Customs at London” (Adams and

¹⁷ The Eddystone was the first lighthouse recorded in modern history to be built on a rock exposed to the sea, located on the Eddystone reef which lies 9 miles off the south coast of England. As Stevenson states, “the Eddystone reef shared with the extensive sandbanks of the south-east coast of England the terrible record of wrecking ships most frequently” (1959: 113). Though a petition had been received in 1655 by the British Admiralty, which it passed on to Trinity House, the latter refrained from acting on such petition. It wasn’t until 1694, when Walter Whitfield received a patent from Trinity House that construction began (Stevenson 1959: 113–114). Completed in 1709, the Eddystone remained in operation until 1755 when it was destroyed by fire (Coase 1974: 366).

Woodman 2013: 120). This monetization of control rights could only be ensured if strong barriers to entry were implemented. Since only Trinity House effectively controlled the supply of lighthouses patents after 1679 (Bertrand 2006: 394), their rental to members and actual administrators of the guild was in effect a transfer of monopoly profits.

This combination of regulatory measures, including price-fixing, fee collection by customs officials, and lighthouses patents, all of which were unintended by-products of circumventing Trinity House's authority, would only create additional inefficiencies in this hampered lighthouse market. Such inefficiencies would present additional superfluous opportunities for pure profit to alert entrepreneurs to avoid and eliminate such inefficiencies. Such superfluous discovery would, again, be an unanticipated and undesirable threat to Trinity House's monopoly privileges. As a result, Trinity House deliberately obstructed the possibility of discovering lower cost methods to provide lighting services free of government intervention. An example that best illustrates this point was the obstruction of the private operation of lightships, also known as "floating flights." Stevenson writes that "Trinity House condemned all the early proposals for establishing lightships" (1959: 138).

The history of the Nore lightship best illustrates this point. Lightships are manned¹⁸ seamarks anchored in a river at a specific point, generally a shallow one, such as shoals and sand banks, for the purpose of avoiding shipwrecks.¹⁹ Compared to other seamarks, lightships had two advantages. First, unlike lighthouses, which are constructed over land, lightships can be located over water to provide sufficient lighting for navigability where the light emitted from a traditional lighthouse might otherwise be insufficient. Second, lightships have an added advantage over buoys, which were otherwise unreliable as seamarks both at night and in inclement weather.

According to historical record, the Nore lightship was the first modern lightship. The Nore lightship was intended to provide light to merchant vessels sailing up the Nore bank, at the confluence of the Thames and Medway rivers. At this shallow point, no lighthouse could be constructed, and any buoy placed there by Trinity House served little use in darkness and in bad weather (Adams 1870: 254; Clarke 2016: 39). However, early attempts to establish such a lightship by Sir John Clayton in 1679 and later by John Waggett in 1724 were obstructed by Trinity House (Stevenson 1959: 138; Clarke 2016: 39).

Anticipating opposition from Trinity House, two entrepreneurs, named David Avery and Robert Hamblin, were "alert" to a particular superfluous discovery, namely by circumventing the existing patent system. Avery and Hamblin did so by securing a 14-year patent for their lightship on July 4th, 1730 (National Archives SP 36/17/81; Anonymous 1865: 624; Stevenson 1959: 139). What is significant here is that Avery

¹⁸ Modern lightships under the Trinity House system are no longer manned. According to Clarke (2016: 150), the majority of manned lightships were decommissioned in the 1970s and 1980s. The last manned lightship in England, the *Inner Dowsing*, was decommissioned in 1991.

¹⁹ Clarke reports that the ancient origins of modern lightships can be traced back to ancient Roman galleys, known as *liburnae*, used by the Roman navy for raids, but also provided lighted beacons to deter pirates. As he further states, these "vessels carried on their masts iron baskets in which fire was built serving as a signal when a friendly vessel was sighted." However, their function as lightships were limited as ancient sailors tried not to sail at night (Clarke 2016: 38). It is unclear whether Avery or Hamblin were aware of their historical existence.

and Hamblin claimed a patent for invention, *not a patent that entitled them to a collection of dues backed by the authority of Trinity House* (National Archives [SP 36/17/81](#); Hardy 1895: 72; Stevenson 1959: 139). So as not to provoke opposition from Trinity House, Avery and Hamblin had stipulated their petition for a patent in a manner that would seem complementary to the existing lighthouse system, claiming that their invention would distinguish coastal lighthouses from each other (National Archives [SP 36/17/81](#)).

On November 29th 1731, two months after the publication of the first advertisement for the lightship, Trinity House petitioned the Crown for the revocation of Avery and Hamblin's patent (National Archives [PC 1/5/3](#); Stevenson 1959: 139–140) on the grounds that they failed to abide by the regulatory authority of Trinity House, an authority granted to it by Parliament. The petition also specified that Trinity House had an *exclusive* right to collect light dues. Dated November 29, 1731, it states in no uncertain terms the following:

Mr. Hamblin hath no colour of right or power either by the Letter or Invention of his Grant to erect Lights or Sea Marks either upon Land or in the water or to receive any Duties or Contributions for the same he having no Grant or Authority for that purpose, for the right of Erecting Lights and Sea Marks both by Land and Sea was anciently Granted to your Petitioners & Confirmed to them by Act of Parliament (emphasis added, National Archives. [PC 1/5/3](#)).

Moreover, in its petition to revoke the patent for the Nore Lightship, Trinity House also cites that Hamblin solicited for funds required to build the Nore lightship, namely by leaving “Parchments as he calls them (not books) for publick Subscription at several places mentioned in the publick papers and hath drawn in several unwary persons to become Subscribers therein to contribute towards the Support & maintenance of his projected Lights” (National Archives [PC 1/5/4](#), 4/4). In its complaint to the Privy Council, Trinity House made much of these “publick Subscriptions” arguing that they constituted, along with the contention that the invention was not new, a breach of the patent, which should be considered null and void (National Archives [PC 1/5/3](#), 3/1). In effect, the ability to privately collect light dues and also use subscription payments as a private exclusionary mechanism were deliberately obstructed by Trinity House.

In response to the Crown's decision to revoke the patent on May 4, 1732, a revocation that had no legal precedent (Stevenson 1959: 139), Avery bought out Hamblin and negotiated with Trinity House for permission to continue operating the lightship.²⁰ In exchange for a yearly rent of £100, Avery secured a 61-year lease to operate the lightship (Clarke 2016: 45; Stevenson 1959: 139). This lease was granted in the form of a new patent, which was reported in newspapers of the time: “On Tue[s]day, [October 27, 1733] a patent pa[ss]ed the great seal for the e[s]tablishment of Mr. David Avery, of Broad-[S]treet, merchant, his floating light at the Nore.” (*Grubb Street Journal*, November 1, 1733).

²⁰ Adams and Woodman (2013: 87) mention that Hamblin attempted to open another lightship (date undisclosed) with a Yarmouth pilot at the Cockle Gat but that Trinity House turned them down, preferring the existing lighthouse.

Contrary to the prevailing consensus in the literature, the case of the Nore lightship illustrates two important lessons. First, the technology to create private excludability of lighthouse services *actually existed*, directly challenging the notion that monopoly patents were an exogenous government solution required to correct a market failure. Second, in response to superfluous discoveries that were unanticipated and undesired by Trinity House, the latter would employ legal measures to exclude the possibility of the private provision of lighthouses. Therefore, nationalization emerged as a by-product of a failure on the part of Trinity House to anticipate the unintended consequences of its prior interventions into the hampered lighthouse market, not a failure of an unhampered lighthouse market.

5 The Nationalization of the English and Welsh Lighthouse System

A third aspect in the dynamics of interventionism focuses on ideological change that is endogenous to the cumulative interventionist process. For our purposes, we will discuss two different ways this occurs: the “gradual-acceptance thesis” and the “dynamic trade-off thesis” (Ikeda 2005: 26–27). Taken together, both can explain why the dynamics of interventionism reinforced the idea in Britain that nationalization of lighthouses was necessary, rather than disintervention.²¹

5.1 Nationalization and the Gradual-Acceptance Thesis

According to the gradual-acceptance thesis, sustained intervention in the market economy, overtime, will impinge upon the prevailing attitudes regarding the coordinative function of private property in aligning self-interest with the public interest. Suppose, for example, intervention creates the conditions for monopoly power in a market. Overtime, if the general public comes to regard the existence of markets as synonymous with monopoly privilege, and therefore against the public interest, this attitude will only reinforce the propensity among public officials to choose to combat such monopoly privilege not by creating the market conditions for freedom of entrepreneurial entry, but rather, through further intervention.

According to its 1834 *Report from the Select Committee on lighthouses*, the House of Commons made the case for the nationalization of all lighthouses not privately owned and operated to be placed under the regulatory auspices of Trinity House. Based on this report, of the 69 lighthouses and lightships operating in England and Wales at the time, 55 of them were directly operated by Trinity House, and of the 14 privately operated lighthouses in England and Wales, 3 were leased by Trinity House, 7 from the Crown, and 4 by Act of Parliament (House of Commons 1834: xxxviii). In 1836, an Act of Parliament vested all lighthouses in England and Wales under the authority of Trinity House, which was empowered to purchase all remaining privately-owned lighthouses. After 1842, privately owned lighthouses under the patent system no longer existed (Coase 1974: 367).

²¹ A third way in which ideological change manifests itself as a by-product of the dynamics of interventionism is what Ikeda refers to as the “self-fulfillment thesis.” Briefly stated, it postulates that “an unintended consequence of an intervention that is based on a spurious rationale could be to render that rationale conceptually coherent, and in doing so provide a stronger basis for further intervention” (2005: 38).

Nationalization was seen as a means to eliminate corruption and abuse attached to the granting of leases among owners of lighthouses: “It further appears particularly objectionable to have continued these abuses by the renewal of the Leases of several Lighthouses” (House of Commons 1834: iv). Given that an unhampered lighthouse market was never allowed to emerge, such corruption associated with the exchange of patents, which conferred monopoly rents to both Trinity House and patent holders, was identified with private property itself. As a result, the “policy of nationalization reflected a new ideological orientation of hostility to private property” in lighthouses (Carnis 2013: 53). Moreover, Taylor states that private profit “from lighthouses came under attack as it was understood to be a result of ‘old corruption’, and also because it was thought to be against the public interest” (2001: 750). “The state and Trinity House had caused the problem by granting rights to levy dues to individuals,” but with increasing hostility towards corruption, specifically by mariners and merchants, as well as the conflation of cronyism with private ownership in lighthouses, “both came to be seen as the solution to the problem” (Taylor 2001: 750).

5.2 Nationalization and the Dynamic Trade-Off Thesis

Another mechanism by which ideological change is a by-product of interventionism is the “dynamic trade-off thesis” (Ikeda: 26–27). For example, when a special privilege is granted to one special interest group, such an intervention cannot occur without simultaneously disadvantaging another special interest group. Moreover, such intervention cannot occur without granting discretionary power to those political actors who are in the position to grant such privileges. The consequence of such intervention will create insecurity among competing interest groups, unleashing a rent-seeking process (Tullock 1967) by which interest groups demand greater intervention. The by-product of this process will not only be a tendency towards an ideological acceptance of greater discretion among political officials, but also an ideological erosion in the rule of law.

Besides eliminating corruption, the House of Commons also justified nationalization as a means to reduce light dues charged to ship owners. According to the 1834 report, it stated that the committee “strongly recommend that the Light Dues should in every case be reduced to the smallest sums requisite to maintain the existing Lighthouses and Floating Lights, or to establish and maintain such new Establishments as shall be required for the benefit of the Commerce and Shipping of the country” (House of Commons 1834: iv). The claim held among the merchant community was that high light dues were a private benefit to lighthouse owners, which came to the former’s expense. However, an abolition of the patent system and the elimination of price fixing of light dues was not considered as a means to eliminate such monopoly power. To expand the scope of market competition and create free pricing under the rule of law would erode the rents derived from existing patent holders and the regulatory authority vested in Trinity House. From a political standpoint, such an efficient market outcome would be politically inefficient, since the benefits of such an outcome would be dispersed in the public interest, the cost of which would fall upon concentrated interest groups, namely existing stakeholders in Trinity House (Tullock 1975; Tollison and Wagner 1991).

Instead, as Carnis states, this “new public provision regime was characterized by consolidation of the monopoly rent for the benefit of the government and redistribution of a part of the revenue among other population groups (mariners and merchants)”

(2013: 55). In effect, the nationalization of lighthouses was a politically efficient response to prevent the dissipation of rents between competing interest groups. For the House of Commons, nationalization was a means to redistribute rents in the form of lower light dues from one interest group to another, from lighthouse owners to shipowners, yet preserve the regulatory authority of Trinity House. Though economically inefficient compared to a free market in lighthouses, such a political outcome made sense given the dynamics of interventionism.

6 Conclusion

Centralization of the entire lighthouse market under Trinity House was ultimately required because regulation unleashed a set of market processes that not could not be anticipated by Trinity House. By intervening in the entrepreneurial market process, Trinity House, initially tasked with regulatory authority in the interest of national defense, unintendedly generated a set of superfluous profit opportunities in the hampered market process, which it found undesirable.

In order to mitigate such undesirable consequences, it extended its entire regulatory reach over all seamarks due to its inability to mimic the market process. Since the incentives and knowledge necessary to seize entrepreneurial profits by eliminating market inefficiencies are precluded to actors in a non-market setting, Trinity House agents were incentivized to use the knowledge that was available to them, namely to seize greater regulatory authority. By doing so, it obstructed the possibility of entrepreneurial market solutions to market inefficiencies before it would have rendered its regulatory authority unnecessary as well as eroded the rents of the beneficiaries of such regulatory power, including in this case holders of lighthouse patents.

As a result, nationalization was the unintended consequence of Trinity House's attempt to eliminate intrusions into its regulatory authority, specifically by preventing the ability to construct lighthouses and collect payment without its permission and enforcement. By redirecting the current lighthouse debate towards the question of nationalization, we can fundamentally address why the private provision of lighthouses was precluded from the historical period discussed in this paper.

The main implication of our argument is that by studying the lighthouse apart from its institutional context, economists have been rather hasty to conclude that market failures associated with the provision of lighthouses are due to the implementation of poorly designed regulation, simply requiring "better" regulation or "better regulators" to intervene into the market process. All interventions, however well-motivated and well-intended, require political discretion, the capture of which will present a potential profit opportunity from which a special interest group can benefit. Therefore, the presence and persistence of a market inefficiency may not be due to an inherent failure of the market, but rather a by-product of government interventions intended to eliminate superfluous discoveries. The logical outcome of pursuing this interventionist process to its conclusion is the elimination of an entire market, as was the case with the nationalization of lighthouses in England and Wales.

Though the lighthouse debate sparked by Coase has generated an interest in lighthouses outside of England and Wales, future areas of research require other case studies that trace the origins of lighthouse regulation in other countries. From this basis,

it will become possible to engage in comparative case studies to analyze how and why certain forms of regulation arose, and why they subsequently led to nationalization. Though the Austrian theory of interventionism provides a valuable theoretical framework, its applicability will require institutional and historical research to illustrate its empirical manifestation across case studies.

Acknowledgements We are very grateful to Peter Boettke, Christopher Coyne, Caleb Fuller, and Ennio Piano for their helpful comments and feedback in writing this paper. We thank two anonymous referees for their valuable feedback and comments, which greatly improved our paper. We also thank the archivists at the Trinity House Corporation for providing us with primary source material for this project. Any remaining errors are entirely our own.

References

Primary Sources

- Anonymous. (1768). *The grants, charters, and letters patent of the Corporation of Trinity-House, relative to shewing their authority to erect, and maintain light-houses, and sea-marks*. London: D. Steel.
- Cotton, J. (1818). *Memoir on the origin and incorporation of the Trinity House of Deptford Strond*. London: J. Darling.
- Hamblin, Robert. (1731). From on board the good intention floating light near the Nore Sand, Oct. 10, 1731. *Daily Courant*, October 12.
- House of Commons. (1834). *Report from the Select Committee on lighthouses*. London: House of Commons.
- National Archives SP 36/17/81. – *Petitions addressed to the King for letters patent under the Great Seal for the sole use and benefit from inventions for the term of 14 years. Inventor's name: Captain Robert Hamblin Nature of Invention: A new method for distinguishing of lights whereby one light (erected for the guidance of shipping) may be perfectly known for another, and consequently every ship's crew or single mariner be informed and know where they are or what coast they are off as well in the night as if it were day*.
- National Archives PC 1/5/3. - *Petition of the Corporation of Trinity House for vacating the letters patent held by Robert Hamblin for his invention of distinguishing lights at sea*.
- Raithby, J. (1823). *The statutes relating to the admiralty, navy, shipping, and navigation of the United Kingdom*. London: George Eyre and Andrew Strahan.
- Trinity House. (1732a). The case of the licensed pilots of the Trinity House of Deptford-Strond most humbly offered to the honourable House of Commons. Printer Unknown.
- Trinity House. (1732b). The case of the Corporation of Trinity House, relating to the Office of Lastage and Ballastage in the River Thames. Printer Unknown.

Secondary Sources

- Adams, W. H. (1870). *Lighthouses and lightships: A descriptive and historical account of their mode of construction and organization*. New York: Charles Scribner.
- Adams, A., & Woodman, R. (2013). *Light upon the waters: The history of Trinity House: 1514–2014*. London: The Trinity House Corporation.
- Alchian, A. A. (1965). Some economics of property rights. *Il Politico*, 30(4), 816–829.
- Alchian, A. A., & Demsetz, H. (1972). Production, information costs, and economic organization. *The American Economic Review*, 62(5), 777–795.
- Allen, D. W. (2012). *The institutional revolution: Measurement and the economic emergence of the modern world*. Chicago: University of Chicago Press.
- Anonymous. (1865). *A foreigner's account of us – The Trinity House* (pp. 623–635). December: Nautical Magazine and Naval Chronicle.

- Bakos, Y., & Brynjolfsson, E. (1999). Bundling information goods: Pricing, profits, and efficiency. *Management Science*, 45(12), 1613–1630.
- Barnett II, W., & Block, W. (2007). Coase and Van Zandt on lighthouses. *Public Finance Review*, 35(6), 710–733.
- Bertrand, E. (2006). The Coasean analysis of lighthouse financing: Myths and realities. *Cambridge Journal of Economics*, 30, 389–402.
- Bertrand, E. (2009). Empirical investigations and their normative interpretations: A reply to Barnett and Block. *Public Choice*, 140(1/2), 15–20.
- Bertrand, E. (2016a). Lighthouses. In A. Marciano & G. B. Ramello (Eds.), *Encyclopedia on Law and Economics* (pp. 1–5). New York: Springer.
- Bertrand, E. (2016b). Coase's empirical studies: The case of the lighthouse. In C. Ménard & E. Bertrand (Eds.), *The elgar companion to Ronald H. Coase* (pp. 320–332). Northampton: Edward Elgar.
- Block, W., & Barnett II, W. (2009). Coase and Bertrand on lighthouses. *Public Choice*, 140(1/2), 1–13.
- Boettke, P. J., & Lopez, E. J. (2002). Austrian economics and public choice. *The Review of Austrian Economics*, 15(2/3), 111–119.
- Boettke, P. J., Coyne, C. J., & Leeson, P. T. (2007). Saving government failure theory from itself: Recasting political economy from an Austrian perspective. *Constitutional Political Economy*, 18(2), 127–143.
- Brubaker, E. R. (1975). Free ride, free revelation, or golden rule? *The Journal of Law & Economics*, 18(1), 147–161.
- Candela, R.A., & Geloso, V.J. (2017). The lightship in economics? Available at SSRN: <https://ssrn.com/abstract=3157100>
- Carnis, L. (2013). The provision of lighthouse services: A political economy perspective. *Public Choice*, 157(1/2), 51–56.
- Carnis, L. (2014). The political economy of lighthouses: Some further considerations. *Journal des Économistes et des Études Humaines*, 20(2), 143–165.
- Clarke, L. (2016). *Light in the darkness: A history of lightships and the people who served on them*. Gloucestershire: Amberley Publishing.
- Coase, R. H. (1974). The lighthouse in economics. *The Journal of Law & Economics*, 17(2), 357–376.
- Demsetz, H. (1968). Why regulate utilities? *Journal of Law & Economics*, 11(1), 55–65.
- Demsetz, H. (1970). The private production of public goods. *Journal of Law & Economics*, 13(2), 293–306.
- Hardy, W. (1895). *Lighthouses: Their history and their romance*. London: Religious Tract Society.
- Harris, G. G. (1969). *The Trinity House at Deptford: 1514–1660*. London: The Athlone Press.
- Holcombe, R. G. (2002). Political entrepreneurship and the democratic allocation of economic resources. *Review of Austrian Economics*, 15(2/3), 143–159.
- Ikeda, S. (1997). *Dynamics of the mixed economy: Toward a theory of interventionism*. New York: Routledge.
- Ikeda, S. (2005). The dynamics of interventionism. *Advances in Austrian Economics*, 8, 21–57.
- Ikeda, S. (2015). Dynamics of interventionism. In P. J. Boettke & C. J. Coyne (Eds.), *The Oxford handbook of Austrian economics* (pp. 393–416). New York: Oxford University Press.
- Kingston, C. (2007). Marine insurance in Britain and America, 1720–1844: A comparative institutional analysis. *Journal of Economic History*, 67(2), 379–409.
- Kirzner, I.M. (1978). The perils of regulation: A market-process approach. *Law and Economics Center: Occasional Paper*. Coral Gables, FL: Law and Economics Center, University of Miami.
- Kirzner, I. M. (1985). *Discovery and the capitalist process*. Chicago: University of Chicago Press.
- Krause, M. (2015). Buoys and beacons in Economics. *Journal of Private Enterprise*, 30(1), 45–59.
- Lai, L. W. C., Davies, S. N. G., & Lorne, F. T. (2008a). The political economy of Coase's lighthouse in history (part I): A review of the theories and models of the provision of a public good. *The Town Planning Review*, 79(4), 395–425.
- Lai, L. W. C., Davies, S. N. G., & Lorne, F. T. (2008b). The political economy of Coase's lighthouse in history (part II): Lighthouse development along the coast of China. *The Town Planning Review*, 79(5), 555–579.
- Lavoie, D. C. (1982). The development of the Misesian theory of interventionism. In I. M. Kirzner (Ed.), *Method, process, and Austrian economics: Essays in Honor of Ludwig von Mises* (pp. 169–183). Lexington, MA: Lexington Books.
- Liebowitz, S. J., & Margolis, S. N. (2011). Bundling and unbundling in new technological markets: Seven easy pieces: The ideal is the enemy of the efficient. In G. A. Manne & J. D. Wright (Eds.), *Competition Policy and Patent Law under Uncertainty: Regulating Innovation* (pp. 77–119). New York: Springer.
- Lindberg, E. (2013). From private to public provision of public goods: English lighthouses between the seventeenth and nineteenth centuries. *The Journal of Policy History*, 25(4), 538–556.
- Lindberg, E. (2015). The Swedish lighthouse system 1650–1890: Private versus public provision of public goods. *European Review of Economic History*, 19, 454–468.

- Lucas, D. S., & Fuller, C. S. (2017). Entrepreneurship: Productive, unproductive, and destructive—Relative to what? *Journal of Business Venturing Insights*, 7, 45–49.
- Meade, H. P. (1949). *Trinity House*. London: Sampson Low, Marston & Co..
- Mill, J. S. (1848 [2004]). *Principles of political economy*. Amherst: Prometheus Books.
- Mises, L.v. (1926 [2011]). Interventionism. In L.v. Mises (Ed.), *A Critique of Interventionism* (pp. 1–32). Auburn: Ludwig von Mises Institute.
- Mises, L.v. (1940 [1998]). Interventionism: An economic analysis. In *Irvington-on-Hudson*. NY: The Foundation for Economic Education.
- Mises, L.v. (1966). *Human action: A treatise on economics* (3rd ed.). Chicago: Henry Regnery.
- Nicholson, C. P. (1983 [1995]). *Rock lighthouses of Britain: The end of an era?* Dunbeath: Whittles Publishing.
- Price, W. H. (1906). *The English patents of monopoly*. Boston: Houghton, Mifflin and Company.
- Redman, J. B. (1843). *Remarks on the lighthouse system of Great Britain: Including a tabular description of the principal English lights*. London: Smith, Elder and Co..
- Ruddock, A. A. (1950). The Trinity House at Deptford in the sixteenth century. *The English Historical Review*, 65(257), 458–476.
- Stevenson, D. A. (1959). *The world's lighthouses before 1820*. London: Oxford University Press.
- Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science*, 2(1), 3–21.
- Sutter, D. (2002). The democratic efficiency debate and definitions of political equilibrium. *The Review of Austrian Economics*, 15(2/3), 199–209.
- Taylor, J. (2001). Private property, public interest, and the role of the state in nineteenth century Britain: The case of the lighthouses. *The Historical Journal*, 44(3), 749–771.
- Tollison, R. D., & Wagner, R. E. (1991). Romance, realism and economic reform. *Kyklos*, 44(1), 57–70.
- Tran, T. (2003). Maritime pilotage acts of the nineteenth century. *The Mariner's Mirror*, 89(1), 31–50.
- Tullock, G. (1967). The welfare costs of tariffs, monopolies, and theft. *Western Economic Journal*, 5(3), 224–232.
- Tullock, G. (1975). The transitional gains trap. *The Bell Journal of Economics*, 6(2), 671–678.
- van Zandt, D.E. (1993). The lessons of the lighthouse: “Government” or “private” provision of goods. *The Journal of Legal Studies*, 22(1), 47–72.
- Wagner, R. E. (1989). *To promote the general welfare: Market processes vs. political transfers*. San Francisco: Market Processes vs. Political Transfers.