



Ex Tridenti Mercatus? Sea-power and maritime trade in the age of globalization



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ABSTRACT

This paper tests an implication of the hypothesis that hegemons provide increased global stability and thus promote international commerce. Specifically, we measure the influence of naval power projections on global trade during the latter 19th and early 20th centuries, a time of relative peace and robust commercial activity. We use archival data on the navies of Britain, France, the United States and Germany, capturing longitudinal measures of ship deployment, tonnage, and ship personnel. First we develop an empirical naval arms race model, and demonstrate that the navies of Britain and France in particular responded rigorously to each other. We then use our estimates of naval power projected around the world by Britain and France to measure their effects on bilateral trade in a panel-data gravity model. Results indicate that while navies had some positive impact on their own nation's trade, other nations' trade suffered. Our results show that rather than bolster globalization, the first global arms race damaged commercial interests and lowered trade potential around the world.

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1. Introduction

“Without commerce the navy would not be needed; without a navy commerce could not exist.”

— Commodore George M. Ransom, USN.¹

The late 19th century witnessed an unprecedented rise in international commerce (O'Rourke and Williamson, 2002). Economic historians still grasp at the reasons for this wave of globalization — was it due to transport technologies (Harley, 1988), the gold standard (Lopez-Cordova and Meissner, 2003), or shifts in the international system of trade (Irwin and O'Rourke, 2011)? But the rise of military power and its influence over global commerce remains

under-explored, particularly for this crucial period for the histories of world trade and military expansions. Did the rise of a few hegemonic powers and the rapidly growing use of the tools necessary for the expansion of power affect trade?

Our study uses archival naval data to assess how sea power projection from the major powers affected bilateral trade patterns from the early 1870s until the precipice of the Great War. Outright wars can disrupt trade through a variety of channels, through embargoes, or privateering activities, or the fomenting of market uncertainty (Williamson, 2011). Naval vessels can conceivably either strengthen or hinder such forces. While the trade-stimulating peace of the *Pax Britannica* prevailed, naval powers still exerted great influence over trade patterns.

To our knowledge the only other empirical study on the effects of naval power on commerce is Rahman (2010), which establishes a general link between naval power and trade for the 18th, 19th and early 20th centuries. Specifically, fighting war ships tended to lower world trade, even for neutral countries, while neutral ships tended to increase world trade. These naval effects are both statistically significant and economically meaningful. The weakness of Rahman (2010) is in its reliance on aggregate measures of sea power-projection.

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¹ From “The Naval Policy of the United States,” *United Service* 2, 1880.

These aggregate measures do not distinguish between ship activities, nor the location of ship deployments. To estimate the trade impacts of active vessel deployment to a specific region, such distinctions are crucial.

Incorporating these distinctions into our current study facilitates a test of a particular aspect of the Kindleberger Hypothesis, which states that hegemonic powers produce public goods that can generate positive spillovers such as peace and commercial security (Kindleberger, 1973, 1981).² Others have echoed this idea when observing naval power struggles during the “long” 18th Century (Modelski and Thompson, 1988), and the U.S.’s seeming displacement of Britain as the “globocop” of the 20th century (Ferguson, 2004). An alternative view exists which might be described as “neo-mercantilism,” where one hegemon’s commercial security must come at the expense of another’s (Bartlett, 2011). It is a conceit anticipated by Parliament member Richard Cobden when he warned in 1846 on empire building’s disruptive effects on free trade.³

To test these competing ideas we analyze naval power projection and its effects on world commerce. This approach allows us to capture the effects of *de facto* measures of power projection, as opposed to effects from *de jure* changes in international policy by hegemon. Specifically we construct naval power metrics which vary by country of origin, region of deployment, and time. To these measures we link bilateral trade data (which varies by country-pair and year) and other various control variables. We analyze not only how ships stationed in a region affect trade between regions, but also different effects on a naval power’s own trade as well as other countries’ trade. The distinction is important, as a navy’s effect on commerce may be considered a private good for the naval power, but a public good (or bad) for others. That sea-power has been used as a national defense strategy to protect one’s own trade and commercial interests is uncontroversial.⁴ Our study differs, however, by demonstrating how naval power can additionally create international externalities that either help or harm the trade of other nations.

This paper joins the body of literature that has analyzed how military presence affects trade. One branch of analysis considers the effects of international conflict on trade.⁵ Another branch of research analyzes the transport infrastructure of trade (Irwin and O’Rourke, 2011), of which sea-going navies form an important component. Our study combines aspects of both. Furthermore, the period we analyze is ideally suited to understand the effects of naval *hegemon*s on commerce. The primary hegemonic tools of power projection during this period were heavy cruisers and battleships, overt pieces of very expensive capital that contained more destructive power than anything that beforehand existed. After the Great War, naval power expressed itself more stealthily in the form of submarines and grew far more difficult to quantify, particularly with respect to locations of deployment.

Capturing the *causal* effects of naval power projection on trade however is complicated by the fact that naval deployment is in part motivated by concerns over trade.⁶ During this period navies were considered by some to be “pioneers of commerce.”⁷ How

navies responded to trade flows remains unclear; naval powers could protect their own trade but could also disrupt or siphon off the trade of rival powers. To address this endogeneity, we employ a two-stage strategy. First, we develop an empirical model of naval power projection, where countries deploy naval capital to different regions for many motivations, including responses to naval deployments by rivals. Thus, our first stage is a simultaneous equations model, where naval deployments to certain regions at certain times are *jointly* determined by all major naval powers. We identify this system using a number of country-specific variables related to each nation’s unique naval capacity and strategic concerns. We argue that these variables are orthogonal both to the naval deployment of a rival power in a particular region, and (more importantly) to bilateral trade flowing through particular regions. This “arms race” model produces estimated measures of naval power deployments around the world.⁸

In the second stage, we incorporate these estimates in a gravity trade model. Following Glick and Rose (2002) we construct a gravity model with panel data using country-pair fixed effects estimation to control for any time-invariant country-pair characteristics.⁹ The naval power estimates created in the first stage mentioned above instrument for spillover effects of power projection on commerce. Arguably they influence trade between two particular countries but are themselves not influenced by such trade. Concentrating attention on the spillover effects of navies provides us another view of the causal effects of military expenditures on international trade.

We first compile data on vessels from the printed naval registries of four major powers of the time: Britain, France, Germany and the United States. These registry books, housed in the archives of the United States Naval Academy and arranged in annual volumes include lists of active naval vessels, their stations of duty (i.e. locations of regional deployment), and basic ship characteristics such as rate, number of personnel, and displacement (in tonnage).

To this we merge a number of other data series (discussed in Section 4). The final merged dataset can gauge the global effects of military power while evolving both spatially and longitudinally. Each country-pair year observation includes estimated measures of naval power. These are aggregate measures of naval power active in waters through which commerce between two nations could conceivably flow. While studied and discussed extensively by naval historians, this rich data on naval vessel deployment has hitherto never been codified, and thus has never been used in careful cliometric study.

Our results, robust to numerous empirical tactics, provide a number of insights. With our first stage “arms-race” study, we see that the British and French compete primarily with each other, matching each other’s naval deployments. Perhaps unsurprisingly, the United States does not appear to impact this race in any straight-forward way. We also observe that the French are increasingly replaced by Germany as Britain’s primary rival, and the arms race shifts concentration over time into northern European seas. Naval strategy was motivated by other factors as well. Global forces such as Britain tend to deploy more naval resources to international “hot-spots” where tensions erupt between it and a country in the region. These empirical results appear consistent with the rhetoric of prevailing naval strategies among the global powers: Britain’s *Bluewater School*, France’s *Jeune Ecole*, and America’s Mahanian doctrine.

Using estimates generated from this exercise in the gravity model, we discover that the two most important naval powers at the time (Britain and France) promoted their own respective trade by

² The specific idea is labeled “Hegemonic Stability Theory.”

³ Speeches on Questions of Public Policy. Vol. 1 Free Trade and Finance (Richard Cobden).

⁴ See for example Lewis (1959), Crowhurst (1977), and Harding (1999).

⁵ Results from this body of work are mixed. Bergeijk (1994), Mansfield and Bronson (1997) and Glick and Taylor (2010) estimate gravity models and find that conflict lowers trade; Mansfield and Pevehouse (2000) and Penubarti and Ward (2000) also estimate gravity models but find no statistically significant effects of conflict on trade.

⁶ As we demonstrate in the results, Hausman tests for endogeneity suggest its presence.

⁷ Schufeldt, Robert W. 1878. *The Relation of the Navy to the Commerce of the United States – A Letter Written by Request to Hon. Leopold Morse, M.C., Member of Naval Committee, House of Representatives.* J.L. Ginck.

⁸ See Blalock (1985) for an in-depth discussion of use of simultaneous equations in modeling arms races.

⁹ We also estimate these using OLS, random-effects, and exporter-importer fixed effects, all producing similar results. We illustrate results from using exporter-importer fixed effects in the Appendix.

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