Discretion and Destruction: Promotions, Performance, and Patronage in the Royal Navy*

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Abstract

How effective is discretion for selecting leaders? We collect new data on the performance of more than 5,800 naval officers serving in the 18th century Royal Navy. Officers fast-tracked for promotion at the discretion of the Admiralty performed markedly better than those "passed over" – the Navy picked future winners. Selection was particularly effective for officers connected to the Admiralty through family ties. Instead of favoritism, we find that family ties and discretion allowed the effective use of private information. Keeping out the "wrong" connected officers while fast-tracking the high-performing ones was a key driver of superior selection.

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1 Introduction

Can patronage – discretion over appointments[1] – enhance the quality of personnel selection? Every large organization faces the challenge of how to promote to leadership positions. Many firms and public sector organizations use rules based on seniority or measured output. In theory, such rules have the benefit of simplicity and transparency, but they can lead to poor choices if important private information is ignored (Aghion and Tirole, 1997; Dessein, 2002; Alonso and Matouschek, 2008; Fang and Moro, 2011).[2]

Remarkably, the empirical literature has rejected this theoretical prediction, concluding that discretion and patronage in public sector hiring overwhelmingly lead to poor personnel decisions.[3] In fact, the literature on bureaucrat selection considers virtually any kind of discretion as a guarantee for corruption and inefficiency (Besley et al., 2021). Analyzing how discretion in promotions affects performance, however, is challenging. The actual use of private information is hard to observe. In most empirical settings, there is also no information about the set of potential candidates. Without direct information on who *could have* been promoted, assessing the quality of promotion decisions is difficult. Finally, reliable and pertinent outcome measures capturing *individual* performance are rarely available.

Our paper is the first to demonstrate that discretion in promotions can result in systematically better selection and hence, improve overall performance. We collect new data on the universe of officer candidates in the 18th century Royal Navy – a period when England won its global empire (Kennedy, 2010). Once promoted, these officers ascended to major leadership positions, independently commanding ships with up to 950 men, with little oversight from London. Identifying who had the "right stuff" to lead was a difficult screening problem, as it is in modern organizations: both character and skill mattered – to appoint a coward to independent command was to court disaster. Our study overcomes the key empirical challenge of evaluating the value of discretion by constructing a new, yearly panel for the period 1690–1849 covering the universe of British naval officers and warships. The resulting "matched captain-ship" dataset contains information on 5,848 officers assigned to 3,904 ships and 56 stations. This dataset allows us to track the career progression and assignments of all officers. In each year, we can identify who was pro-

[1]"Patronage" is defined as the *discretionary* appointment of individuals to governmental or political positions (Webster's II New College Dictionary 1995).

[2]Discretion can also affect the incentives of workers, see Prendergast (1999); Dewatripont et al. (1999).

[3]Colonnelli et al. (2020) show that discretion leads to the appointment of underqualified public officials in Brazil. Fisman et al. (2018) find that social ties reduce the quality of appointments to scientific societies. Hoffman et al. (2018) analyze personnel data from a US firm and demonstrate that overriding mechanical rules leads to poorer outcomes, such as a higher quit rate of hires.

moted and who was not – we observe the entire choice set as well as the actual promotion decisions. We can thus evaluate a total of 2,782 promotion decisions made by 49 different Admiralty Boards.

To measure performance, we exploit rich data on the success of promoted officers. An officer's principal objective was to capture, sink or burn enemy warships. These events were accurately recorded. Our measure of performance is the combined number of captures and enemy ships destroyed (”victories”). We proxy private information with family connections, collecting data on family ties between naval officers and the two most senior naval leaders – the First Lord of the Admiralty and the Admiral of the Fleet – from a large genealogical database. Since lineage was important in 18th century society, family links mattered greatly.[4]

Promotion decisions can only be evaluated if a counterfactual is known – the performance of those not chosen. Absent experimental variation this counterfactual is typically unobserved.[5] A unique feature of our setting allows us to solve this problem: discretion in promotion decisions mainly accelerated the transition to captain. The majority of all officers were eventually promoted. We therefore compare the performance of newly-minted captains with the *eventual* post-promotion performance of officers initially "passed-over." If immediately promoted officers perform markedly better than those ”passed-over,” selection decisions improved the Royal Navy's effectiveness. We compare the selection effect among candidates either connected or unconnected to the Admiralty. The resulting difference-in-difference estimate not only purges time-specific shocks (which may confound a simple comparison between early vs. late promotion), but also allows us to isolate the role of private information in shaping selection.[6] Had admirals favored kin that went on to perform poorly, discretion in hiring would have reduced the Royal Navy's fighting power. If, instead, they picked future ”winners”, the opposite will be true. We establish the conditions under which the post-promotion performance of later promotees can serve as a valid counterfactual to identify the selection effect, and introduce a simple conceptual framework to pin down when discretion improves selection.

Our results suggest that the Admiralty Board (Admiralty) used private information

[4]Private information can come from a variety of sources. We only use family ties because they are predetermined and allow us to measure information asymmetries at a distance of more than two centuries.

[5]The "ideal design" is closest to Dal Bó et al. (2021) who experimentally study how the discretionary allocation of monitoring devices by managers affects performance of subordinates. They collect data on the intended allocation of all managers and randomize whether their choices are implemented or not.

[6]Being passed-over may be demotivating, making the eventual performance of a late promotion an imperfect proxy for the counterfactual performance. Our comparison of early vs. late promotees across connected and unconnected officers allows us to difference out any deleterious effect of late promotions per se.

to select higher-performing officers. We find that promoted officers outperformed those ”passed-over” substantially. While the pre-promotion capture rates of both groups were similar, those chosen for promotion immediately began to capture enemy vessels at a higher rate, and continued to do so persistently. In contrast, the passed-over officers – candidates not chosen for immediate promotion by the Admiralty – had markedly less success, once promoted. In other words, admirals at the top of the Navy hierarchy on average selected men who performed better than those not favored straight away. Crucially, selection was particularly effective for connected officers. These results hold after the inclusion of ship, crew, and station fixed effects, as well as time-varying ship-level measures, suggesting that our results are not driven by differences in assignment. Using granular data on the relative strength of the enemy ship (approximated by the number of guns), we find that connected promotees capture at a higher rate *even* when outgunned. Superior performance is driven by a higher victory rate and a smaller fraction of indecisive engagements. We argue that admirals were, on average, better in identifying “fighting spirit” among connected subordinates by leveraging private information. Admirals could assess their relatives’ probable performance better than that of strangers. For unconnected officers, in contrast – where the promoting admirals had less private information – the difference in performance between promoted and passed-over officers is markedly smaller than for connected officers.

We examine the impact of discretion by comparing officers selected under full vs. partial discretion. The Admiralty had full discretion over appointments in ”home waters” (officers serving in fleets stationed in the British Isles). Overseas, however, local station commanders could also make promotion decisions. Such promotions could be overturned by the Admiralty, but doing so was costly – appointing some officers (for example after a sudden death created a vacancy) was considered a privilege due an overseas commander-in-chief. We can thus identify a subset of promotees whose appointments were made with only partial discretion on the part of the Admiralty, and find that these Admiralty-connected early promotees did not outperform those promoted later. This suggests that, in our setting, promotions to leadership positions worked best under full discretion.

Promoting the right officers was genuinely difficult: the predictive power of regressions of post-promotion performance on observables at the time of promotion is low. When controlling for all differences pre-promotion, the association between connectedness and performance remains strong and highly significant – suggesting that whatever information allowed admirals to pick better captains went beyond their observable (pre-promotion) service record. Even when we flexibly balance the joint distribution of pre-promotion observables between connected and unconnected officers using coarsened exact matching

(CEM), we cannot "explain away" the superior selection among connected officers. This is consistent with private information driving the better promotion decisions.

Compared with a wide range of counterfactual promotion rules, actual practice performed relatively well. Had Royal Navy captains been promoted based on seniority alone, performance would have been markedly poorer – leading to fewer captures of enemy ships. Actual promotions also did much better than random promotions. A selection system based on merit alone would have performed better than random or seniority-based promotion – but it would *not* have outperformed actual selection practice. To derive an upper bound on selection effects, we perform a machine learning exercise using random forest estimation. With this, we predict the future capture rate of officer candidates based on observable characteristics. While the random forest model on average selects better officers than actual practice, the gap is not large – Royal Navy practice captures around three quarters of the maximum gains from selection. Overall, we find that because of superior selection, the Royal Navy went on to capture an additional 400 enemy vessels.

Finally, we examine the source of performance gains due to discretion by studying when deviations from strict merit promotions are effective. We compare the contributions of "fast-tracking" vs filtering – favoring relatives, or holding them back. On average, performance improved when admirals advanced a relative (when merit-based promotion rules *would not* have suggested a promotion); they also improved performance when they "passed over" a relative (when a merit-based promotion rule *would have* suggested a positive decision). While both factors mattered, fast-tracking's contribution was greater. The actual promotion practice in the Royal Navy outperformed merit-based selection as the Admiralty had discretion to ignore what a strict merit-based promotion rule would imply; where the admirals had superior information about candidates, this improved selection.

Our results contribute to the literature on selection and incentives in public organizations (Khan et al., 2015; Ashraf et al., 2016; Weaver, 2018; Ager et al., 2022; Bertrand et al., 2019; Khan et al., 2019). Rational and complex military organizations, such as the Royal Navy, foreshadowed modern, professionalized bureaucracies. Concepts such as meritocracy (often associated with "Weberian" bureaucracies) first emerged in the military. Most empirical work in public organizations finds that discretion leads to the selection of individuals with lower qualifications (Fisman et al., 2018; Colonnelli et al., 2020; Moreira and Perez, 2020; Riano, 2021). Given the difficulty of obtaining a counterfactual for the performance of those not promoted, however, evidence on how the differential selection translates into individual-level differences in performance is scarce. The small literature that *does* exist either sheds light on the negative *incentive* effects of patronage (Xu, 2018), or documents negative or zero effects on the aggregate level (Estrada, 2019; Moreira and Perez, 2020).[7] Our rich data and unique setting allows us to shed light on both the selection *and* performance of promoted officers at the individual-level. Our study is the first to show that discretion in promotions can, in fact, lead to greater performance – providing an empirical "existence result" consistent with theory, emphasizing the importance of private information in improving selection. As such, our results resonate with evidence from the private sector for the selection of managers (Bertrand and Schoar, 2006; Bertrand, 2009; Benson et al., 2019).[8]

We also relate to the historical literature on the Royal Navy. Historians have long attributed its superior performance to Britain's financial might: building, staffing, and maintaining large fleets and then supplying them effectively on the high seas for years (Dull, 2009; Rodger, 2005). Although most of the literature is descriptive, economic analyses of navy performance have stressed the role of high-powered incentives for officers and also for seamen (Allen, 2002), such as severe penalties for failure, the payment of substantial prize money (Benjamin, 2005), promoting men from the lower deck as a result of performance (Benjamin and Thornberg, 2007), and successfully solving incentive problems in the provisioning its large fleets (Allen, 2018). The Royal Navy also improved rapidly over time, gathering more experience in naval warfare and arguably learning more from it than its rivals (Benjamin and Tifrea, 2007). We similarly conclude that the Royal Navy's carefully balanced system of incentives figured prominently in its success. Yet for that system to work, the right men had to be in command because real-time monitoring was de facto impossible (Allen, 2002). We explore the role of discretion in selecting them.

Finally, understanding promotions in the public sector is crucial because it influences state capacity (Rauch and Evans, 2000; Dal Bó et al., 2013; Finan et al., 2017; Besley et al., 2021). This paper contributes to our understanding of the origins of state capacity. A growing literature has emphasized the importance of military competition for state building (Tilly, 1990; Besley and Persson, 2010) and pointed out that many of today's underdeveloped countries are located in areas with few interstate conflicts (Herbst, 2014). Contributions to the state-building literature have typically focused on the growth of taxation

[7] Xu (2018) shows that patronage discouraged favored colonial bureaucrats from raising revenue; Estrada (2019) compares the performance of teachers hired based on standardized tests rather than through union discretion, and finds inferior performance for schools with a greater share of exam-hired teachers. Finally, Moreira and Perez (2020) study the impact of a merit-reform on fiscal outcomes at the customs-district level.

[8] The exception is Hoffman et al. (2017); these authors find that private sector managers who ignore test recommendations hire (low-skilled) service workers that end up having shorter tenures. Related to our mechanism of superior private information is Fisman et al. (2017), who shows that Indian loan officers award loans to same-caste applicants that result in lower default rates.

(Besley and Persson, 2010; Gennaioli and Voth, 2015). Our findings demonstrate the importance of employee selection for state capacity.

2 Historical background

2.1 Size, organization, and career progression

The Royal Navy was a mainstay of UK military power, and absorbed a large share of UK military expenditures. Between 1690 and 1810, the Navy grew from 147 to 752 larger ships. At its peak, during the Napoleonic Wars, it had more than 160,000 men under arms. Each individual ship required an enormous expenditure (Brewer, 1990). Pay for seamen along with the cost of sails, cordage, food, powder, shot, and the spars all added to the expense of running a fighting navy (Baugh, 2015; Allen, 2018).

The Royal Navy was run by the Board of Admiralty, consisting of several Lord Commissioners of the Admiralty (composed of both naval officers and politicians); the Board's president was known as the First Lord of the Admiralty. While the UK Cabinet set overall naval strategy, the Admiralty presided over the naval administrative system. The Admiralty devolved many decisions to overseas station commanders (Pope, 2013).

Most aspiring officers went to sea at an early age – 10 or 12 was common. After no less than six years, they could apply for promotion to lieutenant. They were then examined by a tribunal of active captains (Pope, 2013). Upon receiving a commission, lieutenants would typically serve under a senior captain on a big warship (Allen, 2002). They could also be appointed as commanders of a smaller vessel. The decisive step in a naval officer's career was promotion to *post-captain* – the officer in command of a large vessel. The Admiralty formally had full discretion over officer appointments and assignments – what contemporaries called "patronage." For officers serving in home waters, all appointments and promotions were directly made by the Admiralty. On overseas stations, local commanders could also make appointments, which had to be confirmed by the Admiralty [9] Some lieutenants were promoted within a year or two; others had to wait much longer, or were never promoted. Both performance and connections mattered.[10] Post-captains typically progressed from commanding frigates with 20–32 guns to larger battleships ("ships

[9] Examples of the Admiralty overturning local station commanders' recommendations and provisional appointments abound; there are also many cases of the Admiralty forcing appointments on local commanders, picking men who had not been recommended by the local commander (Malcomson, 2007).

[10] "For a young officer who hoped for command, or for post-rank, nothing was more swiftly effective than to take an enemy ship of equal or greater force." (Rodger, 1987, p. 295)

of the line"), carrying 80–120 guns and a crew of 900-950 (Baugh, 2015). Lieutenants made "post" at a young age had a good chance of becoming an admiral.

2.2 Success in the Age of Sail

No European navy had a major technological advantage (Allen, 2002; Rodger, 1987). Despite the similarity of ships, battle outcomes for most of the 18th and early 19th century were heavily one-sided. During the Napoleonic Wars, for example, the Royal Navy lost only 166 ships while inflicting the loss of 1,201 ships on its enemies (Allen, 2002). This "exchange ratio" was a staggering 7:1 (and 32:1 for battleships). Leadership and fighting spirit were key to success. Captains could either shy from fighting another ship, as happened time and again during the eighteenth century – or they could aggressively engage enemy vessels. Navy regulations punished lack of fighting spirit because there was "a real problem of cowardice" (Rodger, 1987, p. 244).[11] Ultimately, a captain's character was more important than rules and procedures.

The Royal Navy could count on a number of advantages. Professional competence was high – commissions could not be purchased (Rodger, 1987). The large merchant navy provided skilled manpower in wartime, often "pressed" into service (Allen, 2002).[12]

2.3 Discretion in promotions in the Royal Navy

Personal connections were crucial for Royal Navy recruitment. Boys often joined a ship through family connections; and promotion to midshipman, lieutenant, and post-captain were all affected by who they knew.

Promotion to post-captain was the crucial step in an officer's career. It also mattered for the Navy's performance overall: "the country in wartime [was saved] by giving outstanding men rapid promotion . . . the right men ended up in the right jobs" (Pope, 2013). Since the risk of appointing a coward was a key concern, gallantry in action boosted promotion prospects. Not every lieutenant had a chance to distinguish himself. Because character in the heat of a naval battle mattered for outcomes but was also difficult to predict, private information played an important role in making the right promotion decisions.

[11] "British commanders were expected to defeat enemy forces much stronger than their own . . . In single ship actions, it was reckoned that a British ship had a good chance against an enemy of 50 percent greater gunpower and crew" (Lavery, 1998, p. 317).

[12] Rodger (1987) analyzes the crews of several ships from the middle of the 18th century and finds that the share of pressed men averaged 15%. Another 56% were volunteers, and 26% re-enlisted after having been "paid off" for their previous service. The rest of the ship's company were officers.

Historians have argued that the use of information derived from personal connections ("patronage") facilitated selection based on ability. Such patronage did not privilege the well-connected, but facilitated the rise of men from simple backgrounds:

> ... We are mistaken to suppose that a system based on personal influence must ... have chosen unworthy men. *A system of patronage to identify and advance men of ability . . . might be at least as efficient as any examination ... in bringing skillful officers to the head of the profession.* (Rodger, 1987, p. 275, emphasis added)

In other words, choosing the next set of fighting captains was crucial. Making the judgement call of whether an officer was going to fight to the last or not was difficult; an admiral's personal knowledge of a candidate could facilitate this decision.[13] In section 4, we introduce a framework that clarifies how and when discretion enhances performance.

3 Data and descriptive evidence

3.1 Personnel, ship and station data

Our core data are from Threedecks,[14] a web resource on navies during the Age of Sail. It contains information on 25,229 ships, 33,959 seamen, and 1,022 actions and battles among European sea powers.[15] We use Threedecks' information on the Royal Navy to construct our main dataset, restricting the sample to the period 1690–1849. We combine individual-level data for officers (lieutenants, post-captains, admirals) with a ship-level panel to construct a matched "ship–officer" dataset. The dataset contains rich information on the number of actions undertaken, the number of enemy ships captured or destroyed, and whether the ship itself was captured, wrecked, or sunk.

We complement the Threedecks data with newly digitized station lists covering the period 1690-1849. These provide information about ships and vessels in commission, by assigned naval station and task.[16] We link these records to our core data to obtain a panel that allows us to track officers, their assigned ships and geographical location over time.

[13]Indeed, some of the most outstanding naval officers like Horatio Nelson, came from humble backgrounds and were promoted by close relatives – demonstrating that discretion and performance could go hand in hand. He first joined his uncle's ship, and passed the exam for lieutenant in front of the same uncle who had risen to Comptroller of the Navy, one of the leading administrators. By age 21, he was already in charge of a frigate, commanding 200 men (Coleman, 2001).

[14]`http://www.threedecks.org`

[15]We extracted the data in September 2018; the numbers are correct as of that date. The dataset is maintained by naval enthusiasts; it is a trusted source referenced by the National Maritime Museum in Greenwich.

[16]These records are available in the UK National Archives under ADM 8 – Admiralty: List Books. We digitized the lists on annual basis for the reference month of January. See Figure A1 for a sample.

Our data is comprehensive and accurate: It covers more than 95% of ships listed in other sources (Colledge and Warlow, 2010); in a random sample of 1% of the officers, we checked careers against standard references (Clowes et al., 1897; Syrett and DiNardo, 1994) and found no meaningful discrepancies. The final dataset contains information on 3,904 ships and 5,848 officers over 160 years – a total 82,958 officer-ship-year observations. At the peak, we can reference 500 fighting events per year and connect them to 1,500 officers. Table 1, Panel A shows summary statistics. The average officer serves on 3.5 different ships with an average of 32 guns. An officer remains in the Royal Navy for an average of 12.5 years and commands a ship for 6.4 years. More than half of all officers make it to post-captain.

Performance is generally well-recorded and objectively measured: the capture and the sinking of enemy ships.[17] Naval officers kept detailed ship logs; events like the sinking of an enemy ship were widely reported. On average, each officer could claim one victory.

3.2 Measuring connections

Our analysis focuses on connections to the two top admirals – the First Lord of the Admiralty and the Admiral of the Fleet. These two officers were central to all personnel decisions: they promoted officers or confirmed promotions by station commanders,[18] determined who commanded which vessel, or sent an officer to a distant station or a posting near home.

We use genealogical data from the Peerage dataset[19] to measure whether officers were connected to the Admiralty. We link officers in our dataset to the Peerage data by matching based on full name, title, year of birth, and year of death. For 11% of officers, we find entries in the Peerage. We interpret missing entries as not connected.[20] For matched officers, we compute the shortest genealogical distance.[21] We consider an officer to have family ties

[17] Both sinkings and captures reflect the success of naval captains. We therefore combine them into a single indicator of performance, which we call "victories."

[18] In home waters, all appointments were made directly by the Admiralty; its de facto control over overseas promotions increased over time (Rodger, 2005).

[19] http://www.thepeerage.com

[20] Since nearly all admirals are documented, we can assume that the remaining officers are unconnected to their superior. This compares with a match rate of 34% for governors of the British Empire 1854–1966 (Xu, 2018), who were recruited from a more elite population. Our results also hold when restricting the sample to only those with a Peerage entry. Throughout the empirical analysis, we include a dummy that denotes whether an officer is matched in the peerage data.

[21] *Pre-determined* family ties capture direct blood relatedness through links with earlier generations. These ties exclude marriages, which form network links endogenously.

when he is separated by no more than 16 degrees from either of the two leading admirals (as in Xu (2018)). The results do not critically depend on the chosen cut-off.[22]

The high average degree of distance in our relatedness measure raises the question whether distantly related individuals actually know each other. While naval officers and admirals were, on average, much closer to each other than members of Britain's noble elite, we are unable to directly observe social ties.[23] Our measure of connectedness is thus a proxy for social proximity giving access to private information. For interpreting our empirical results, we only require that two connected individuals are more likely to share social ties than two unconnected individuals, a standard assumption in models of network formation (Jackson, 2010).

Figure A2 shows the share of connected naval officers over time. Although only a few officers were linked to the top of the naval administration in the first decades of the 18th century, their share increased. It peaked during the French Revolutionary Wars. The proportion of connected officers then fell sharply after John Jervis (Earl of St. Vincent), a highly successful career admiral from a middling background, became First Lord of the Admiralty; he decided to curtail the role of "influence" in naval appointments.

Out of the 5,848 officers in our dataset, 562 were connected to the Lord Admiral or the Admiral of the Fleet. Since individuals holding these positions come and go, connectedness to the very top of the Navy hierarchy varied over time. Among the 562 officers who were ever connected, 196 are connected throughout their career. The remaining 366 experienced a switch. Table 1, Panel B reports descriptive statistics for each year. The mean share of officers connected to the Admiralty in each choice-year is 11%. The mean number of unpromoted officers is 112, and the mean number of promotions is 18.

3.3 Post-promotion performance by connectedness

We first present simple descriptive evidence before analyzing the performance of promotees using our counterfactual design. In particular, we report the raw performance measure conditional on the officer's assignment of ship and station.

Figure 1, Panel (a) plots the capture rate of connected promotees by the ship's rate. The larger a ship, the *lower* its rate – fifth rates would carry 32-40 guns and 300 crew; a first rate,

[22] The results hold when using degrees of separation as a continuous measure (subsection 5.3).

[23] In Figure A3, the dashed line shows the distribution in the degrees of separation between pairs of randomly sampled individuals from the peerage dataset (i.e. the elite of England). The solid line shows the degrees of separation between officers and the two top men at the admiralty. A cut-off of 16 degrees of separation is equivalent to the closest 20% of pairs.

around 100 guns and 850 men. Smaller, fast-sailing ships typically had greater opportunities to capture as they were sent on independent cruises – they scored the highest number of captures in our data. Big, slow-sailing battleships were used mainly for blockade service, as flagships, and in major sea-battles. They have the lowest capture rate. Crucially, in every category, connected promotees outperformed. In small frigates, the ratio is more than 2:1. It is somewhat smaller for larger ships, but remains substantial for all of them.

Each ship of the Royal Navy was assigned to a naval station or task. Figure 1, Panel (b) shows capture rates by navy station, broken down by connectedness. Some tasks and stations were much more propitious for sea-officers than others – capture rates for ships assigned to foreign convoys were, for example, more than twice as high than those on the Ireland or the East Indies station. Remarkably, in most assignments, connected promotees outperformed the unconnected, often by a large margin. Only on four out of 14 stations did unconnected promotees on average outperform. This speaks against the notion that connected officers were simply favored in terms of their assignments.[24]

These performance differences by rate and station are substantial and suggest that connected officers performed markedly better, independent of station or task assignment. This could be for several reasons – they could be of uniformly higher quality (e.g., coming from naval families), or they could be more positively selected from the pool of potential candidates.[25] We now introduce a framework to estimate selection effects, using information about the full pool of potential promotees in each year and their subsequent performance.

4 Promoting for performance

We want to assess the quality of selection by the Royal Navy. Did the Admiralty pick men with greater fighting ability? We introduce a simple conceptual framework that motivates our empirical strategy. Consider $i = \{1, ...N\}$ officers who serve for $t = \{0, 1, ..T\}$ years. Officers can serve either in a junior (lieutenant, $j = 0$) or senior position (post-captain, $j = 1$). All officers start as juniors and are eventually promoted to senior positions in year

[24]Appendix Figure A4 goes one step further, estimating "leave-out" fixed effects for the performance of each ship (excluding the current officer's influence on the average performance). The graph shows how connected promotees outperform at every level of a ship's average capture rate.

[25]In Appendix Figure A5, we disaggregate the performance by ship rate into "early" and "late" promotees, for connected and unconnected, and show that the connected officers *chosen* by a relative are mainly responsible for outperformance.

T. The performance of an officer i in year t is given by

$$y_{it}^{j} = \theta_i^j + \tau_t + \varepsilon_{it}^j \tag{1}$$

Performance depends on the unobserved ability of officer i in position j, a time effect τ_t and idiosyncratic factors ε_{it}^j. An officer has abilities (θ_i^1, θ_i^0), which can vary across positions: some agents are more effective as juniors, others as seniors.

Let $T(i) = \{0, 1, ..T\}$ denote the year of promotion for each officer i. In each decision year $t > 0$, the Admiralty can promote from the subset of junior officers. $P_{it} = \mathbf{1}[T(i) = t]$ thus denotes if an officer is promoted in a given choice year or passed over (to be eventually promoted in $T \geq T(i) > t$). Admirals in charge of promotions consider both private benefits (from favoring connected officers) and expected post-promotion performance:

$$\text{Promote if } E[Y_{it+1}^1 | y_{it}^0, c_{it}] + \alpha c_{it} \geq \nu_{it} \tag{2}$$

Based on junior-level performance y_{it}^0, the Admiralty tries to predict the likely average post-promotion performance $Y_{t+1}^1 \equiv \frac{1}{T-t}\Sigma_{j=t+1}^T y_{ij}^1$. How predictive the junior-level performance is, however, depends on the joint distribution of (θ_i^1, θ_i^0). When the link between pre-promotion and post-promotion performance is weak, private information may be important. For a subset of "connected" officers, the Admiralty also has private information ($c_{it} = 1$) that can predict future performance. The amount of private information is time-varying depending on the Admiralty's ties to the subordinate officers.

The Admiralty may also be biased towards connected officers, deriving private benefits from the promotion of a "connected" officer captured by α. The Admiralty will promote an officer i whenever the combined utility from performance and private benefits exceeds the outside option ν_{it} (reflecting opportunity costs and capacity constraints).

Table 2 compares the characteristics of junior officers promoted vs passed-over by the Admiralty.[26] Column 1 shows that promoted commanders had, on average 0.26 more victories per year than unpromoted ones.[27] The promoted also had slightly longer tenure and command experience. Officers with elite connections, numerous family members who also

[26]We restrict the panel to all unpromoted officers and estimate $y_{it-1}^0 = \beta_0 P_{it} + \tau_t + \varepsilon_{it}$, where i denotes the officer and t the choice-year. The dependent variable y_{it-1}^0 measures pre-promotion officer characteristics. Pre-promotion characteristics reflect those in the first year the Admiralty-team rotated in, to ensure that only pre-promotion characteristics are used. With the choice-year fixed effects τ_t, the dummy P_{it} captures the difference in pre-promotion characteristics among officers promoted vs. passed over in the same year. Officers remain part of the choice set as long as they have not been promoted or exited.

[27]As described, we use the term "victories" for the sum of captures and sinkings of enemy ships.

served in the navy, or who were connected to the Admiralty, were on average more likely to be promoted. In columns 2 and 3, we examine whether the promotion patterns differ by connectedness. If anything, we find that selection among connected officers was *even more* merit-based (column 2). [28] Interestingly, for connected officers elite links did not translate into higher promotion prospects (Column 2).

Overall, the Admiralty was more likely to promote connected officers, but also selected them more on merit. This may reflect bias or better information. To examine this question, we examine the performance of promoted officers. Formally, we are interested in how well the promotees chosen in year t perform relative to those who *could have* been promoted in the same year, but were passed over:

$$\delta_1(c_{it}) \equiv \underbrace{E[Y^1_{it+1}|P_{it}=1,c_{it}] - E[Y^1_{it+1}|P_{it}=0,c_{it}]}_{\text{Selection effect}}$$

The selection effect depends on private information c_i. If such information through family connections made it easier for the navy hierarchy to identify talent, we should find that the Admiralty is better at picking high-performing officers among the relatives than among the unconnected, where Admirals were less likely to have private information. In contrast, if the selection effect for connected officers is small, the Admiralty is likely distorting the allocation in favor of connected officers.

To examine this question empirically, we exploit the fact that we – uniquely – observe the entire pool of eligible candidates for promotion in every year: in the Royal Navy, every lieutenant could be promoted to post-captain as soon as they had received their commission.[29] To see this, consider a cohort of lieutenants (some of whom serve as commanders), eligible for promotion for the first time in year t. Some are promoted ($P_{it}=1$), and some are not ($P_{it}=0$). Of the latter, all are again eligible for promotion in the following year, and may or may not be promoted. In each decision year, we now compare the performance of those promoted (″fast-tracked″ promotees, $Y^1_{it+1}|P_{it}=1$) with those "passed over" but eventually promoted ($Y^1_{it+1}|P_{it}=0,...,P_{iT(i)}=1$).

The challenge is that the post-promotion performance of officers in the "passed over"

[28]Figure A7 plots simple survival curves as a function of (i) connectedness and (ii) performance. Gray lines indicate the share of unconnected officers who have not yet been promoted, and black lines indicate their connected peers in the same circumstances. In the left panel, Figure A7, dashed (solid) lines represent high-performing (low-performing) officers. Both connected and unconnected promotees were rewarded for performance. Benefits from performance are greater for connected officers.

[29]This is in contrast with the practice in other navies, such as the US Navy. There, candidates can only come up for promotion twice (″up or out″).

group can only be observed once they, too, have been promoted. To construct a counterfactual, we use the fact that most of those who are passed over in year t are promoted in some future year $T(i)$ – their "type" is eventually revealed.[30] Using the eventual post-promotion performance of the officers initially "passed over" but ultimately promoted, we obtain:

$$\begin{aligned} \delta_2(c_{it}) \equiv\ & E[Y^1_{it+1}|P_{it}=1,c_{it}] - E[Y^1_{iT(i)+1}|P_{it}=0,...,P_{iT(i)}=1,c_{it}] = \\ & \underbrace{\delta_1(c_{it})}_{\text{Selection effect}} + \underbrace{\Delta\tau(t,T_i)}_{\text{Time effects}} - \underbrace{E[\varepsilon^1_{iT(i)}|P_{it}=0,...,P_{iT(i)}=1,c_{it}]}_{\text{History dependence}} \end{aligned} \tag{3}$$

where the time effects $\Delta\tau(t,T_i)$ capture changes in the opportunity to perform due to differences in the aggregate environment faced by early vs. late promoted officers.[31] To obtain a consistent estimate in a simple difference, we thus require (i) the absence of time effects ($\tau_t = 0$) and (ii) the absence of history dependence ($E[\varepsilon^1_{it+1}|P_{it}] = 0$).

Our empirical analysis will focus on the difference in the selection effect (3) as a function of connectedness. This difference-in-differences allows us to net out confounders and rely on less stringent identification assumptions. For example, comparing early vs. late promotees within connected and unconnected officers accounts for the possibility that connected officers are better on average or have different socioeconomic status. Similarly, those passed over are by definition made post later than those promoted right away. Being passed over could also reduce later performance directly. Since we observe both connected and unconnected promotions in t and $T(i)$, however, we can difference out the common time shocks (see (3)). We can also difference out any history dependence (e.g., a differential treatment effect from early promotions) as long as it does not vary by connectedness:

$$E[\varepsilon^1_{it+1}|P_{it}=0,...,P_{it+1}=1,c_{it}] = E[\varepsilon^1_{it+1}|P_{it}=0,...,P_{it+1}=1] \tag{4}$$

The data support these necessary assumptions. Being passed over has no differential contemporaneous effect on victories by connectedness (Figure A8). Put differently, we do not observe that being passed over has a treatment effect on performance *per se* that varies for connected and unconnected officers. This means that post-promotion performance is a good counterfactual for passed-over officers, whether connected or not.[32]

[30]Those never promoted had characteristics that predict low post-promotion performance (Table A1).

[31]More precisely, the time effects capture the differences in mean performance for the time windows under which early vs. late promoted officers serve under, $\Delta\tau(t,T_i) = \frac{1}{T-t}\Sigma^T_{j=t+1}\tau_j - \frac{1}{T(i)-t}\Sigma^T_{j=T(i)+1}\tau_j$.

[32]Appendix Figure A8 shows that (i) there is no differential contemporaneous effect of being passed over on performance – those passed over do not subsequently change their performance differentially by connect-

To implement the empirical estimation, we construct a panel dataset of post-promotion performance. We employ a "stacked" design, focusing on each choice year t. For officers promoted in year t, we use actual post-promotion performance. For those who are passed over and promoted later, we use their performance *once promoted*, while controlling for changes in the aggregate environment since the decision-time. Figure 2 illustrates the method. Each line represents the performance of an officer. Stars indicate captures of enemy ships. At time t, the Admiralty promotes officers: A and C are promoted, B and D are passed over. Post promotion, we directly observe the capture rate of A and C on their (post-)ships. B and D continue to serve as commanders. At time $t+1$, B and D are promoted to post-captain. We use their subsequent (post-promotion) performance as if, from time t onwards, they had captured at this (new) rate.[33] This allows us to compare the performance of promoted and passed-over officers, conditional on connectedness. Formally, for promoted officers where the decision year t coincides with the actual year of promotion $T(i)$, we use directly observed data from the year in question. For passed over officers who are promoted after the decision year $t < T(i)$, we use *time-shifted* data from the later promotion (controlling for changes in the aggregate environment).

The resulting dataset is a panel containing the post-promotion performance of each officer i in each choice year t during the year after promotion k. Let y_{itk} denote the post-promotion performance of officer i of choice year t in year k after the promotion $k \geq 0$. We estimate the following regression model:

$$y_{itk} \equiv y_{iT(i)k} = \beta_0 P_{it} + \beta_1 c_{it} + \beta_2 P_{it} c_{it} + \tau_{tk} + \delta' x_{itk} + \varepsilon_{ikt} \tag{5}$$

where performance is measured as the number of captures in a given year.[34] P_{it} is a dummy that is 1 if the officer i was promoted in the choice year t and 0 if the officer was passed over (and eventually promoted in a later choice year). The time-varying dummy $c_{it} = 1$ if the Admiralty is connected to the officer in the year of the decision and 0 otherwise.[35] τ_{tk} are decision year specific dummies for each year of tenure after the promotion. Since being promoted early *and* being connected to the Admiralty also affect the post-promotion

edness and (ii) there is also no differential pre-trend by connectedness when comparing the pre-promotion performance of those officers who were passed over but eventually promoted (Appendix Figure A9).

[33] 53% of lieutenants were *eventually* promoted. This provides a lower bound on the overall selection effect. Table A1 shows that never promoted officers share many characteristics of low-performing post-captains.

[34] The results are robust to alternative definitions (e.g., inverse haversine, count model, see Table A3).

[35] The time-varying nature of the connections measure is driven by the frequent turnover of personnel at the Admiralty. Our results also hold when only restricting the sample to those who experience changes in connectedness ("switcher") throughout their careers (Table A4).

tenure duration (Figure A7), the inclusion of the post-promotion year FEs ensures that we are only comparing the performance among officers in the same post-promotion year.[36] The vector $\mathbf{x_{itk}}$ also controls for inputs affecting performance. In particular, we control for ship fixed effects and year-specific effects to account for differences in assignment and the environment under which officers serve. The standard errors are clustered at the officer-choice set level it, corresponding to the level of the treatment variation.[37]

The coefficient β_2 is the key parameter of interest – the differential performance of officers chosen for promotion by a relative at the Admiralty. If the connected Admiral on average picked "winners" and passed on or delayed the promotion of weaker officers, we expect $\beta_2 > 0$. Conversely, if private interest and favoritism towards untalented relatives dominated, we expect $\beta_2 < 0$. β_0 captures the selection effect among unconnected officers – the performance difference between promoted unconnected (vs passed over unconnected); β_1 captures the performance difference among those passed over while connected (vs passed over unconnected). Note that β_0 and β_1 are not the main parameters of interest as their interpretation relies on much stricter identification assumptions (see eqn. 3). For example, while those promoted early may also be younger (and thus more motivated), age at promotion is not a confounder for our key interaction β_2 as long as its impact does not differentially vary with connectedness. Similarly, while connected officers may differ significantly from unconnected officers, unobserved correlates will only confound our key estimate if they vary differentially by being promoted early. Finally, we can also directly exploit the time-varying nature of the connection measure by comparing only *within* officers similarly connected throughout their career.

5 Main results

5.1 Selection effects under discretion

Table 3 analyzes post-promotion performance. Those promoted in a given choice year outperform those passed over (but eventually promoted). This is true of every year after the promotion decision. Officers promoted by the Admiralty straight away capture an additional 0.011 enemy ships a year, about 11% relative to the mean of the dependent variable (Panel A, column 1). Rapid promotion by the Admiralty favored men of greater ability.

[36] For those promoted early and connected, we find an extra 0.8 years of post-promotion service – a modest difference, relative to the sample mean of 13 years (Appendix Table A2).

[37] The results also hold when clustering at the officer-level (Appendix Table A5).

In column 2, we control for differences in the promotion environment. We constrain the comparison to only promoted and passed over officers who made post during wartime and control for the total (leave-out) number of victories in that year. Both covariates are interacted with each post-promotion year. The promotion effect remains nearly unchanged.[38]

In column 3, we introduce the key parameter of interest, allowing the promotion effect to vary by connectedness. As the interaction effect promoted × connected shows, the selection effect is much stronger among connected officers – promoted, connected officers capture at a markedly higher rate than passed-over officers (raising the yearly average by a quarter). Officers who are merely connected do not outperform to a significant extent. Unconnected (early) promotees still outperform unconnected, passed-over officers, but the difference is small and statistically insignificant. Outperformance is thus concentrated amongst connected early promotees. We can further refine the comparison by including fixed effects that constrain the comparison to officers who were passed over for the same number of years before eventually being promoted (column 4). While this fully absorbs the promotion effect in levels, the difference-in-differences setup allows us to look at the interaction, which remains strong and significant. The combined evidence is thus consistent with admirals leveraging private information to improve selection.

Our results are unlikely to be driven by connected officers having stronger incentives to perform because a relative is in office.[39] Heads of the admiralty come and go, but captains serve for many years: We can exploit variation of an officer's connectedness over time to see if their outperformance occurs mainly while a relative leads the Admiralty. There is no evidence that *contemporaneous* connectedness of an officer is significantly associated with greater success, reducing the likelihood that our main result reflects greater effort of connected promotees (Appendix Table A14).

Officers can only be victorious while they are in command. In column 5, we restrict the sample to only those post-promotion years during which an officer is commanding a ship.[40] As column 5 shows, the coefficient is now double that in the preceding column, but

[38]As Appendix Table A6 shows, the external war conditions do not vary with whether an officer was promoted while connected or not. Consistent with the Admiralty using discretion to select better when stakes are high, Table A7 shows that the selection effect was particularly large for war-time promotions.

[39]Xu (2018) examines this question for the British colonial service and finds the opposite, with connected governors performing less well with a relative in office.

[40]The main factor that explains variation in the overall share of officers commanding is whether Great Britain was at war or not. During wartime, post-captains commanded a ship more than 80% of the time (Figure A6). The probability to be given command does not vary by connectedness or being promoted. In Appendix Table A8 we also conduct a bounding exercise. Since being given command is uncorrelated to the independent variable of interest (Promoted × Connected), the results are virtually identical when imputing different levels of counterfactual performance for those who are not given command.

average capture rates rise too. Relative to the mean of the dependent variable, the gain in performance is now 23%, nearly identical to the 25% in column 4.

Task allocation and ship quality. Did connected promotees outperform because they were better? Or did they receive easier tasks and better equipment? We use detailed data on the quality of Royal Navy ships, and on the allocation of ships to naval stations and tasks to shed light on the mechanism through which superior performance emerged.

Overall, we find little evidence that connected promotees are given more opportunities to perform or are allocated better ships. In Appendix Table A9, we show that connected promotees are equally likely to be assigned to serve in the main commands – Home, Mediterranean, West Indies – and not systematically allocated to stations with higher average capture rates. Similarly, Appendix Table A10 shows that there is no evidence of differential equipment allocation. The age of ships, the time since refits, the quality of the crew or the fixed effect of the ship in terms of capture performance (calculated as a leave-out mean, excepting the officer in question) are all unrelated to being a connected promotee.

Since connected promotees are assigned comparable stations and ships, the inclusion of these controls in Panel B of Table 3 leaves the estimate virtually unchanged. In column 2, we include station FEs, restricting the comparison to connected and unconnected promotees assigned to the same station (e.g. West Indies) or task (e.g. Foreign Convoy & Cruizer). In column 3, we further include ship FEs. In column 4, we also include ship-crew FEs to account for differences in the quality and composition of the crew.[41] Finally, column 5 also includes time-varying ship controls for the ship's age, a dummy for whether the ship was retrofitted and a time-varying measure of a ship's gun count. Despite this extremely stringent specification – including station, ship-crew FEs and time-varying controls – we continue to find significant outperformance by connected promotees.

Degrees of discretion. So far, we have treated all promotion decisions as subject to full discretion. Frictions in making appointments, however, generated variation in de facto discretion. Commanders-in-chief on more remote Navy stations – such as the Indian Ocean, or the West Indies – were effectively granted substantial authority in promotions (Morrow, 2018). Their appointments were subject to approval by the Admiralty. In particular, death vacancies were considered the prerogative of the station commander (Rodger, 2005, p. 388). In contrast, appointments in "home waters" were made directly by the Admiralty.

[41] The date when crews are paid off is recorded, allowing us to identify when different crews were serving. While these FEs account for composition changes in the crew, they do not control for their attitudes. Differential attitudes, however, will only be a confounder if they vary systematically with being promoted early *and* being connected. The historical circumstances also make it highly unlikely that the crew would have been familiar with the intricacies of blood lineages connecting their current captain with the Admiralty.

This means that the Admiralty's discretion was reduced in promotion cases of officers stationed overseas; while it could override station commander decisions (and did so), the need to fill positions quickly meant that overriding such station appointments was harder and more costly to the Admiralty. If the hypothesis that discretion "worked" in the Royal Navy is correct, leading to better appointments, we should find that outperformance is concentrated amongst direct appointees; those chosen overseas should perform less well – and possibly even show no outperformance at all.

Two indicators help us identify overseas appointments – whether an officer replaces a captain who died, and promotions listed as "confirmed by the Admiralty" in our database. The latter was necessary to make temporary promotions by an overseas commander permanent; the former was one of the main routes for the station commander to exercise patronage of his own. Table 4 shows results from our baseline specification (column 1). We then show the pattern for Admiralty appointments (neither death vacancy-induced promotions nor "confirmed"), before showing the result for the combined group of overseas promotees (columns 3). Finally, column 4 shows results for death vacancy appointments only. We find outperformance of connected early promotees only for Admiralty appointments. Where the Admiralty had less say, the coefficients are mildly positive, but never statistically significant. In line with our hypothesis, full discretion yielded the best results.

5.2 Enemy fighting power and single ship actions

Our results so far suggest that the better performance of connected promotees is not driven by them receiving better station assignments or ships. The results in Table 3 already controlled for a variety of fixed effects, including time-varying ship controls interacted with connectedness. However, it is possible that assignments were easier for connected captains – they may have been given tasks involving weaker enemies, for example. In this case, the outperformance in Table 3 would simply reflect such favoritism. We therefore focus on a subset of our data where we have granular information on the fighting power of both British and enemy ships. This allows us to study the probability of winning *conditional* on a naval engagement, using more than 10,000 observations. Figure 3 provides a simple visualization.[42] We plot the probability of the British ship capturing or sinking the enemy vessel as a function of relative firepower, proxied by the gun ratio.[43] British ships

[42] The regression version can be found in Appendix Table A11.

[43] We define the gun ratio as the ratio of British guns to overall guns in the engagement, adding enemy and British guns – i.e. with a ratio of 0.5, two ships would be evenly matched. An even more accurate assessment would require taking the weight of broadsides into account, i.e. the weight of shot fired by the cannons of

held a sizable advantage overall. In a straight fight – with a gun ratio of 0.5 – victory for the British ship was a virtual certainty. Even when outgunned 2:1, British captains fought with no less than an even chance.

Panel A on the left-hand side shows the victory probabilities for connected captains; Panel B, for unconnected ones. The rate of success conditional on relative firepower differed by group. By far the most successful captains were those promoted by a relative at the Admiralty ("promoted connected"). Captains who had been passed over were markedly less successful: at a gun ratio of 2:1, connected and immediately promoted captains won 63% of the time, while the passed over and connected captains only managed 12-18%. The difference between promoted and passed-over is largest for the connected over most of the gun ratio range; for the unconnected, performance is more similar. The fact that connected early promotees outperform connected officers "passed over" by a large margin suggests that selection was improved by the use of private information. Among the unconnected, those promoted faster were only more successful when fighting at a disadvantage, i.e. with relatively low gun ratios.

So far, we have used data from all naval battles where the enemy and British ship in action could be identified. Many of these were fleet actions, with numerous warships engaged simultaneously. Success in these could depend on overall naval command, on a ship's assigned position, or on spillovers from adjacent ships. While we can control for the fighting power of enemy ships, other factors influencing success might have differed across assignments. Our rich data allows us to focus on a subset of naval engagements uncontaminated by such decisions. We analyse single ship duels – chance encounters on the high seas of ships with relatively similar fighting power. Such encounters were not driven by potential favoritism, but reflect the "fog of war." These duels therefore provide a "controlled" setting in which the outcome – winning, draw, or defeat – can be fully attributed to the performance of the ship commanded by a single captain. It also allows further insight into the factors responsible for the greater success of connected promotees.

The British Navy dominated in single-ship combat. Of the total of 172 such encounters, British officers captured or sank 115 enemy ships, lost only 16 ships, and engaged in 41 inconclusive skirmishes. The British public viewed defeat in single-ship action as especially shameful (Lambert, 2013). The enemy ship's size (as measured by number of guns or crew members) in such encounters is remarkably comparable (Appendix Table A12) – even though connected promotees typically commanded slightly larger ships.

each side. While available in some cases, using this information would reduce sample size yet further.

Table 5 presents the results for single-ship actions. We implement the research design in the same way as before, comparing the outcomes of single ship actions for officers promoted early vs those passed over, broken down by ties to the Admiralty. Consistent with previous results, fast-tracked officers who had ties to the Admiralty at time of promotion were more likely to win single ship engagements than those who were passed over and unconnected (Column 1). A single-ship action is deemed won if the enemy ship was either captured or sunk. Connected promotees are significantly more likely to win: they are 24 p.p. more likely (on average) to emerge victorious in a single-ship engagement (column 1). Compared with a mean of 65.6%, this difference is sizable. To ensure that the higher capture rate is not driven by more favorable terms of engagement, column 2 controls for the gun ratio (i.e., the ratio of own to enemy guns). Even though ships with a more powerful broadside were more likely to win, controlling for gun ratios leaves the gap in winning rate nearly unaffected.

Connected promotees were also less likely to *lose* an engagement, but the effect is not tightly estimated (column 4). Their overall higher success rate is also driven by a smaller number of inconclusive engagements: in essence, connected officers either lost or won and never experienced a draw, whereas nearly a fourth of all engagements involving unconnected British captains were indecisive (column 3).[44] In single-ship encounters, then, a major determinant of the performance was "fighting spirit" – a willingness to fight until victory was won, and the determination to pursue an enemy that was trying to break off the engagement. Arguably, the fact that connected captains were more willing to see a naval battle through to the end suggests that a relative at the Admiralty was, on average, better in identifying "fighting spirit", leveraging private information.

5.3 Drivers of selection

Connected officers captured more enemy vessels pre-promotion, and they continued to outperform thereafter. This also holds when we control for observable ship characteristics and – as much as possible – for assignment. We argue that superior selection among connected officers reflects private information on the part of the Admiralty. Here, we provide three types of evidence that support this hypothesis: First, officers promoted late by a relative perform markedly worse – but unconnected (late) promotees do not. Second, after adjusting for all observable ex ante characteristics, and closely matching promotees

[44] To withdraw from a fight without suffering major casualties was generally considered dishonorable for a Royal Navy captain – and could result in a court martial.

to other officers with the same characteristics, connected (early) promotees outperform. Third, outperformance for connected officers is greater the smaller the genetic distance between officer and the promoting admiral.

Differential outperformance for connected promotees. Appendix Figure A10 shows the selection effect as a function of the number of years between the early and the late promotion of an officer. On average, those actually promoted (early) made better fighting captains than those who were passed over and only promoted later. Among the unconnected, those promoted later are performing worse than those promoted right away – but the gap does not grow with the number of years until promotion. In contrast, among the connected officers, the longer the wait for promotion, the lower eventual performance is. In other words, the longer a relative at the Admiralty decided not to promote a connected captain candidate, the lower his performance in the end was.[45]

The pattern in Figure A10 strongly suggests that admirals used private information in their selection decisions: They succeeded in picking ”winners.” The fact that the slope of the two lines is different also speaks against a mechanical interpretation – with officers perhaps becoming demotivated because they were passed over.

Ex ante characteristics and coarsened exact matching. A natural question to ask is how much of the outperformance of connected early promotees reflects ex ante observable characteristics. We examine this question by holding pre-promotion captures and other observable characteristics constant. In Appendix Table A15 , column 1 first shows the baseline specification from Table 3, column 4. In column 2, we restrict the comparison to candidates with the same number of pre-promotion captures, using fixed effects. As before, the average connected officer is, on average, no better in battle. It is the connected early promotees who outperform to a significant extent. In column 3, we include fixed effects for every level of pre-promotion years of command and tenure. Once again, the estimated differential promotion effect for connected officers remains. In column 4, we include all other available pre-promotion observables (elite and navy ties). As before, connected promotees outperform above and beyond the level that could be expected, given observable pre-promotion performance, service record, elite and naval ties. This outperformance is substantial, increasing capture rates by 25%.

Our argument is based on the comparability of connected and unconnected officers

[45] In Appendix Figure A11 we zoom into the subset of officers passed over by a connected Admiralty, distinguishing whether the eventual promotion was made by a connected or unconnected Admiralty. Consistent with the use of private information, we find that those eventually promoted connected are higher performing than those who were eventually promoted by an unconnected (and thus less informed) Admiralty.

based on observables. The analysis so far in Table A15 used fixed effects for pre-promotion observables to capture public information prior to promotion. We now use Coarsened Exact Matching (CEM) (Iacus et al., 2012) to make officers as similar as possible to unpromoted officers in terms of the joint distribution of observable pre-promotion characteristics, matching every connected officer to an unconnected officer with comparable pre-promotion traits. CEM is deliberately imperfect – instead of matching on precise values, CEM coarsens the distributions of covariates before assigning observations to strata. While balance of targeted, ex-ante covariates will not be perfect, the procedure ensures that many "treated" officers will have a "control" observation assigned to them. We match officers based on the following properties: (i) officers are promoted in the exact same choice year (ii) they have an identical fighting record, in terms of enemy captures and sinkings, up to the time of promotion (ii) they have similar tenure (0-6 years, 6-10, 10-16, and more than 16 years), (iii) they have similar experience in commanding vessels themselves, and (iv) they have the same number of elite connections.

Our use of CEM differs from other applications in economics.[46] Our objective is *not to ensure that promotion was as good as randomly assigned*. Instead, we want promoted officers to be as similar as possible to unpromoted officers on all observables prior to promotion. What remains are differences in unobservables, which may be predictive of future performance. The key test is whether connected officers, who were promoted by a relative that may have possessed better private information, did indeed perform "above and beyond" what might have been expected, given every possible dimension of their previous, *publicly observable* track record. Out of the 17,071 total officer $\times$ choice year observations, the CEM routine allows us to match 10,439. The decline in the number of observations reflects the stringent requirements we impose on matching officers. The resulting estimate is shown in column 5 of Appendix Table A15. After promotion, connected promotees still continue to outperform the unconnected and promoted, and the coefficient grows in size. Finally, we can validate the pre-promotion balance on observables using an event study. In Figure 4, we plot the selection effect (comparing promoted vs passed over officers) for connected and unconnected promotions around the decision year. As the figure confirms, prior to the year of the promotion decision, there is no systematic difference between the promoted and unpromoted in their capture rates. After promotion, consistent with the regression version (Table A15, column 5), the gap in the promotion effect opens up. While capturing at the same rate as the unconnected pre-promotion, the promoted and connected

[46] For example Azoulay et al. (2019) uses CEM to ensure that academic fields with the loss of a "superstar" are compared with identical ones, so that treatment is as good as randomly assigned.

subsequently outperform.

Selection effects by genetic distance. We define ”connected” as 16 or fewer degrees of separation between leading admiral and potential promotee following Xu (2018). If promotion decisions for connected officers were better because of private information, we should expect that closer ties would spell better decisions.

This is the question we examine in Table A13 in the Appendix. We show that the greater the genetic distance between the promotee and the Admiralty, the worse post-promotion performance was. Our estimates imply that, with a doubling of the degrees of separation, connected promotees would have won 0.009 fewer times – a sizable effect equivalent to a 7.2% decline relative to the annual victory rate.

5.4 Alternative promotion rules and aggregate impact

Navy promotions are essentially a form of the *prediction policy problem* (Kleinberg et al., 2015) – admirals are trying to predict officers' future performance, once promoted, using both private and public information. Our setting offers a unique opportunity to consider the effect of counterfactual promotion rules. For every candidate, we not only observe their pre-promotion characteristics but also the post-promotion performance, once eventually promoted. This allows us to evaluate counterfactual promotion rules. Importantly, we can also directly gauge the value of discretion by asking whether deviations from a given counterfactual promotion rule improves or weakens selection. We conduct a machine-learning exercise to assess how good selection could have been under ideal conditions, and compare the effectiveness of actual decisions with this (ahistorical) standard.

Formally, consider an alternative promotion rule $d_{it}^{Alt} = f(y_{it-1}^0)$ that maps a vector of pre-determined characteristics observed prior to the promotion y_{it-1}^0 to the decision to promote officer i in decision year t or not. For example, under a merit based rule, officers would be ranked based on the number of pre-determined cumulative captures, and the N highest-ranked ones would be promoted until all slots are filled. We can thus estimate the counterfactual selection effect as:

$$y_{itk} \quad = \quad \beta d_{it}^{Alt} + \tau_{tk} + \delta' x_{itk} + \varepsilon_{ikt} \qquad (6)$$

where β captures the selection effect of promoting an officer under the given counterfactual promotion scheme d_{it}^{Alt}, and the remaining terms are defined as in Equation 5.

To ensure the comparability of selection effects, we fix the number of promotions in each year at the actual total. When promotion rules produce a tie, we break it randomly. To avoid results being driven by particular realizations of such a randomization, we re-run each counterfactual 1,000 times and report the mean estimate as well as the full distribution to assess the dispersion. Several assumptions are needed to interpret our results. Our focus on the mechanics of selection abstracts from general equilibrium effects. A merit-based promotion system, for example, may have an additional, positive effect by incentivizing performance. Similarly, a pure seniority-based promotion system will affect selection but may also disincentivize since it decouples promotions from performance. Finally, since all officers are eventually promoted, our results capture the differential performance due to promoting the "right person at the right time." As such, our counterfactuals are likely to constitute lower bounds.[47]

Figure 5 summarizes the results. As a baseline, we first consider the selection effect from random promotions, abstracting from any incentive responses. We do so by following a randomization inference approach where we randomly draw promotees in each choice year, and repeat the exercise 1,000 times. We then plot the distribution of the estimated selection effects (red dashed curve). Performance is measured as the (residualized) rate of annual post-promotion captures per officer. Unsurprisingly, the mean selection effect of random promotions is centered around 0, with a SD of 0.003. As the estimated distribution also shows, the selection reflected in actual promotions (the point estimate delineated by the red vertical line in Figure 5, corresponding to Table 3, Panel A, column 2) is unlikely to be due to pure luck: only 2 out of the 1,000 random promotions yields a set of officers that outperforms those actually chosen by the Royal Navy.

Connected officers could be higher-performing on average. Our main result would then reflect the favoured selection of such officers, irrespective of private information. To rule out this possibility, we also consider a "pure favoritism" rule, where admirals maximize the number of connected promotions in each choice year.[48] Again, we simulate this promotion rule 1,000 times and plot the distribution as a green dotted line. Pursuing a "pure favoritism" rule would typically lead to better selection than random promotions. At the same time, it would result in worse selection than the promotion practice actually used by the Royal Navy, suggesting that the selection effect we capture goes beyond population differences between connected and unconnected officers. The mean performance of

[47]The average late promotion occurs 6.3 years after an early one. If better captains made better admirals, early promotions may have had important, indirect repercussions.

[48]If the number of connected officers exceeds the number of promotion slots, connected officers are drawn at random. Conversely, if the number of promotion slots exceeds the number of connected officers, unconnected officers are promoted at random until the capacity constraint is met.

officers selected according to "pure favoritism" is only 27% of the performance under the actual selection rule. The sign and size of the differential are striking. Admirals leveraged their connections to screen their kin, acting as gatekeepers for poorly performing ones.

We also consider two other classic rule-based promotion systems: promotion by seniority, and promotion by merit. Seniority-based promotions are a defining feature of many public organizations. We assess promotion by seniority by ranking officers in each choice year based on their years of tenure, giving strict preference to those serving longest. The distribution of officers' performance implied by strict seniority promotions is shown as a solid dark blue line (Figure 5). Seniority promotions lead to strictly worse selection than promotions at random. This is consistent with negative evidence found in other public sector settings (Bertrand et al., 2019). In our context, promoting based on seniority induces misallocation: those with limited tenure but a proven track record would have to wait for promotion instead of being fast-tracked.

We also consider merit-based promotions. Our measure of merit is enemy captures and sinkings pre-promotion. The yellow distribution shows how officers chosen by a merit rule would have performed.[49] Promotion by strict merit stochastically dominates seniority based, random, and "pure favoritism" promotions. The mean selection effect of merit-only promotions is still 20% lower than the actual promotion effect; 59% of the estimated merit effects result in inferior selection compared with actual promotion practice.

Navy promotions vs machine learning predictions. How well did the Royal Navy promotion practices perform relative to an objective upper bound? We use machine learning algorithms, which can find and exploit complex interactions in the data, to derive the best possible predictions of future performance. In line with recent work in economics (Kleinberg et al., 2018), we examine how much better the Admiralty *could have* done had it been able to exploit all available hard data in an objective fashion.

We use all pre-promotion characteristics to fit a Random Forest algorithm, which allows for non-linear interactions of predictors. The algorithm examines, for a subset of the data, which parameters have the greatest predictive power, creating "branches" based on yes-no decisions conditional on threshold values of the predictor variable. Figure A12 shows an example of such a decision tree. In this case, the algorithm uses 1,116 officers and tries to predict victories. At the initial decision node, it splits by victories prior to promotion (more or less than 1.5). At the second node, it exploits information on overall connectedness of an officer and a higher cut-off for pre-promotion performance. At the final level

[49] As before, ties are broken randomly, thus creating a non-deterministic selection effect.

(”leaves”), it has partitioned the sample into eight groups, with N ranging from 2 to 761, and predicted performance varying from 1.1 captures post-promotion to 17.4. We do not constrain the number of decision nodes (branches), using 200 different simulations of the decision tree (to promote or not to promote). The model’s prediction is then determined by the average of decisions across these 200 simulated trees, with each tree getting a ”vote.” Each tree samples from the available dataset a subset, randomly chosen, to ensure that simulations are as uncorrelated as possible (”bagging,” or bootstrap aggregation). The actual performance of officers chosen by the Random Forest algorithm is then tested against a 20% ”hold-out” sample of data (not used for fitting the Random Forest) for validation.

To recreate the conditions of actual Admiralty decision-making, we feed the Random Forest algorithm with an expanding sample of observations. For example, the prediction for the performance of officers promoted in 1771 is based on data for the period 1690-1770 only. As new data arrives, the algorithm is allowed to update decision parameters, as admirals would have done in London – but we do not permit the machine learning procedure to use future data (from 1801, say) to improve predictions in 1771, for example.

The estimated selection effects are shown as the dashed turquoise line. The post-promotion performance of promotees chosen by the random forest algorithm stochastically dominates all other promotion rules. While not quite on par, actual Royal Navy selection practice was only 27% less effective than the upper bound of positive selection, derived from state-of-the-art machine learning procedures – the Admiralty did not make decisions quite as well as modern machine learning techniques would have done, but they got close. This is striking because in other high-stakes settings, such as bail decisions, machine learning approaches have proven markedly superior to human judgment (Kleinberg et al., 2018).

Filtering vs fast-tracking. Why was the actual selection superior to a merit-based rule? Discretion in promotion can work through two margins of adjustment: the admiralty could choose to promote a lieutenant even if an alternative rule did not favor such a choice (”fast-tracking”). Conversely, admirals could and did decide that an officer candidate should wait – even if according to seniority, or merit, or some other alternative standard, a promotion seemed like the right choice (”filtering”). Narrative histories of the Royal Navy emphasize the numerous cases when well-connected officers – even those with links to the Admiralty Board – were not promoted or not given command. To study which of these two channels explains the performance of actual Admiralty promotions, we use strict merit-based promotion as an alternative – the rule yielding the highest average selection effect among the alternative counterfactual promotion rules considered. Here, $d_{it}^{Alt} = f(y_{it-1}^{0})$ is a rule that maps pre-promotion traits - in this case, captures while a lieutenant - y_{it-1}^{0} to promotions. To decompose the selection effect, we estimate:

$$y_{itk} = \beta_0 d_{it} + \beta_1 d_{it}^{Alt} + \beta_2 d_{it} d_{it}^{Alt} + \tau_{tk} + \delta' x_{itk} + \varepsilon_{itk} \tag{7}$$

where the variables are defined as before (Equation 5). We define as "fast-tracking" a promotion against the rule recommendation $d_{it}^{Alt} = 0$ and $d_{it} = 1$; filtering is conversely defined as $d_{it}^{Alt} = 1$ and $d_{it} = 0$ – passing an officer over although the strict merit rule recommended promotion. In Table 6, we compare the effect of these two levers, using victories per year as the dependent variable. As before, ties in the merit rule are broken at random, and we report the estimated mean and standard errors based on 1,000 repetitions.

On average, for both connected and unconnected, merit-based promotions would have "worked," creating a positive selection effect: when actual promotion decisions followed the recommendation of the strict merit rule, the resulting promoted officers outperformed those passed over – as our earlier results imply. For the sample of connected officers, there is a strong and significant effect on performance from fast-tracking promising young officers that a mechanical merit-based rule could have missed. Filtering – passing over of an officer despite a positive recommendation by the merit-based rule – also added to performance for connected officers – on average, relatives who would have been promoted based on pre-promotion performance but were ignored by their kin at the Admiralty underperformed. The coefficient on filtering itself is marginally below statistical significance, but it is different from the effect of fast-tracking. The overall difference between the fast-tracking and the filtering coefficients reflects the advantage conferred by the use of private information. Importantly, the same pattern is not visible for unconnected officers, where private information was less abundant. Neither filtering nor fast-tracking changed performance significantly – in the absence of private information, deviations from a merit-based rule did not improve selection. Overall, our results lends support to the historians' conclusion that "the patronage system was not perfect... [but it is] far from clear that any method since devised has identified and promoted merit any more efficiently" (Rodger, 1986, p. 302).

Aggregate effects. How much did promotion practices matter in the aggregate? To obtain a back-of-the-envelope number, we can scale up the estimated annual selection effect by the total number of promotions and average post-promotion years of service.[50] This implies that the Royal Navy captured or sank an additional 407 vessels thanks to its promotion procedures – instead of promoting at random. This is sizable and equivalent to

[50] Aggregate captures = Selection effect × Total # of promotions × Avg. post-promotion tenure, where the total number of promotions is 2,782, with an average post-promotion tenure of 13.3.

10% of actual captures. Compared with strict seniority, the gain is even bigger – a plus of 895 enemy ships, or approximately 20% of the total. Merit-only promotions would have been inferior to actual practice, too, but only by a margin of 74 ships, or 2% of all captures. Had the Admiralty been able to use modern statistical tools to select captains, it could have increased the number of captures even further, by 111 (or 2.6% of total captures).

Again, we abstract from general equilibrium effects. Nonetheless, these magnitudes are informative of the advantage the Royal Navy gained by allowing discretion in promotions.

6 Conclusion

Leading large, complex organizations requires special skills (Stogdill, 1974; Northouse, 2018). The empirical literature on personnel selection has concluded that rules dominate discretionary selection (Hoffman et al., 2018; Colonnelli et al., 2020). We analyze a century of promotion and performance data from the Royal Navy during its 18th century heyday. We examine the performance of officers promoted to captain – the crucial step in naval careers, and one that placed men in positions of independent command, leading warships with up to 950 men into battle. Judging a candidate's personality was crucial: How a captain would perform in the heat of battle was hard to predict, and cowardice was a key problem. Admirals had to make a momentous, irreversible decision – promotion to post-captain – based on little "hard" information.

Did the admirals at the top simply favor their relatives, or use personal knowledge to pick the more promising candidates? Each admiralty team had a substantial number of candidates to choose from. Among relatives, the ones they actually picked went on to outperform, on average, while the ones they decided to pass over turned out to be distinctly inferior in their (eventual) fighting performance. For unconnected officers, the same pattern holds, but is markedly weaker. Even when we use matching techniques to render promoted and unpromoted captains as similar as possible, based on ex-ante available information (i.e. by giving them the same year of promotion, very similar tenure, and fighting experience), the officers actually chosen outperformed – and especially those related to the apex of the naval hierarchy. Historians have emphasized the importance of character and courage in naval combat (Rodger, 1986). According to our data, connected officers were more likely to fight to the finish – either winning or losing in almost all cases. Unconnected officers fought many more inconclusive engagements, suggesting that many of them lacked fighting spirit. This strongly suggests that private information helped to identify future officers with the "right stuff."

Our paper is the first to show empirically that discretion in promotions *can* improve selection. It does so with detailed data that is superior to that in most modern HR environment, with information on the pool of candidates for every round of promotions and on "hard" outcomes. Our results suggest a surprisingly effective use of private information in the Royal Navy. Admirals not only accelerated the promotion of talented relatives; they also screened out unpromising kin. The use of both mechanisms strongly suggests that private information – and not favoritism – is key for our results. Discretion in promotions was an important contributor to the Royal Navy's overall effectiveness, increasing enemy captures by more than 400 vessels. Alternative promotion rules – such as strict seniority or strict merit – were unlikely to outperform the observed promotion pattern.

Our findings show that discretion and patronage in promotions can enhance performance. This is true at the intensive and extensive margin – outperformance of connected officers was largest in settings with full discretion, and smaller where discretion was limited. The overall pattern contrasts with existing evidence which favors rule-based hiring and selection, especially in the public sector. However, most earlier empirical work has focused on relatively low-skilled occupations (Colonnelli et al., 2020; Hoffman et al., 2018; Estrada, 2019). We argue that discretion is more likely to be beneficial in the selection of highly-skilled leaders. Providing more autonomy in highly competitive environments can be beneficial, allowing decision makers to use private information to improve decisions.

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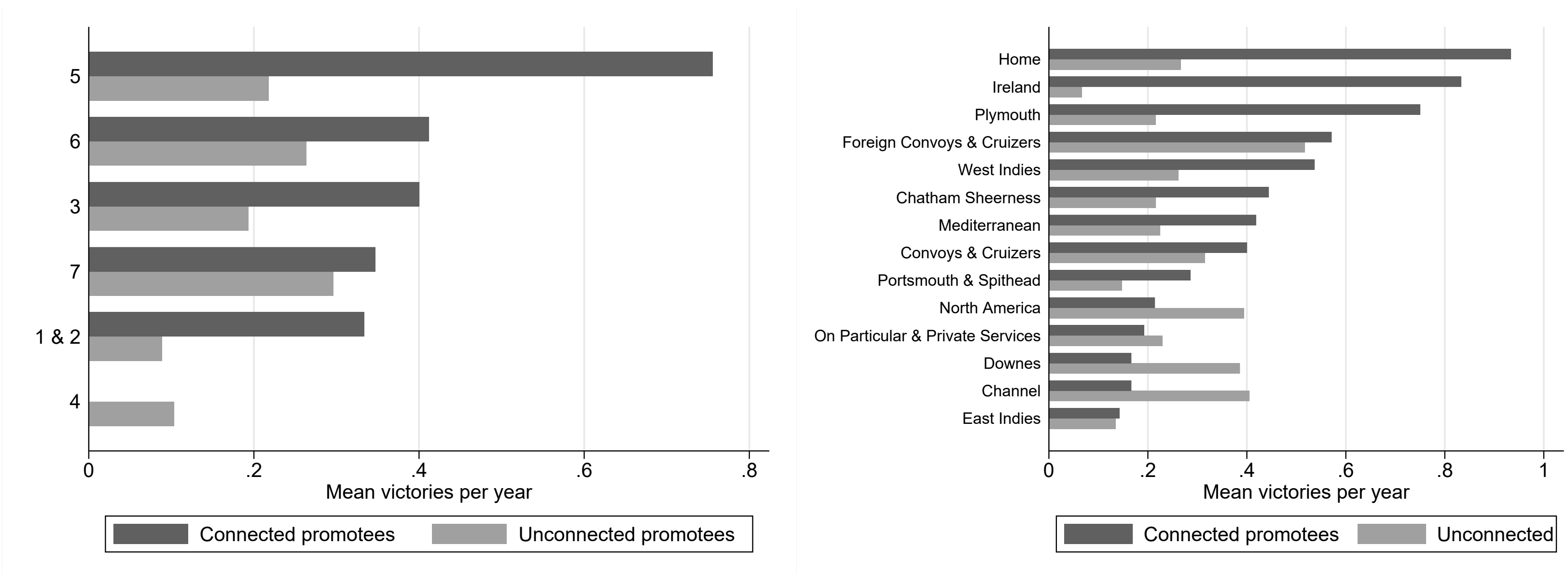
Figures and Tables

Figure 1: Average performance of post-captains by connectedness at time of promotion

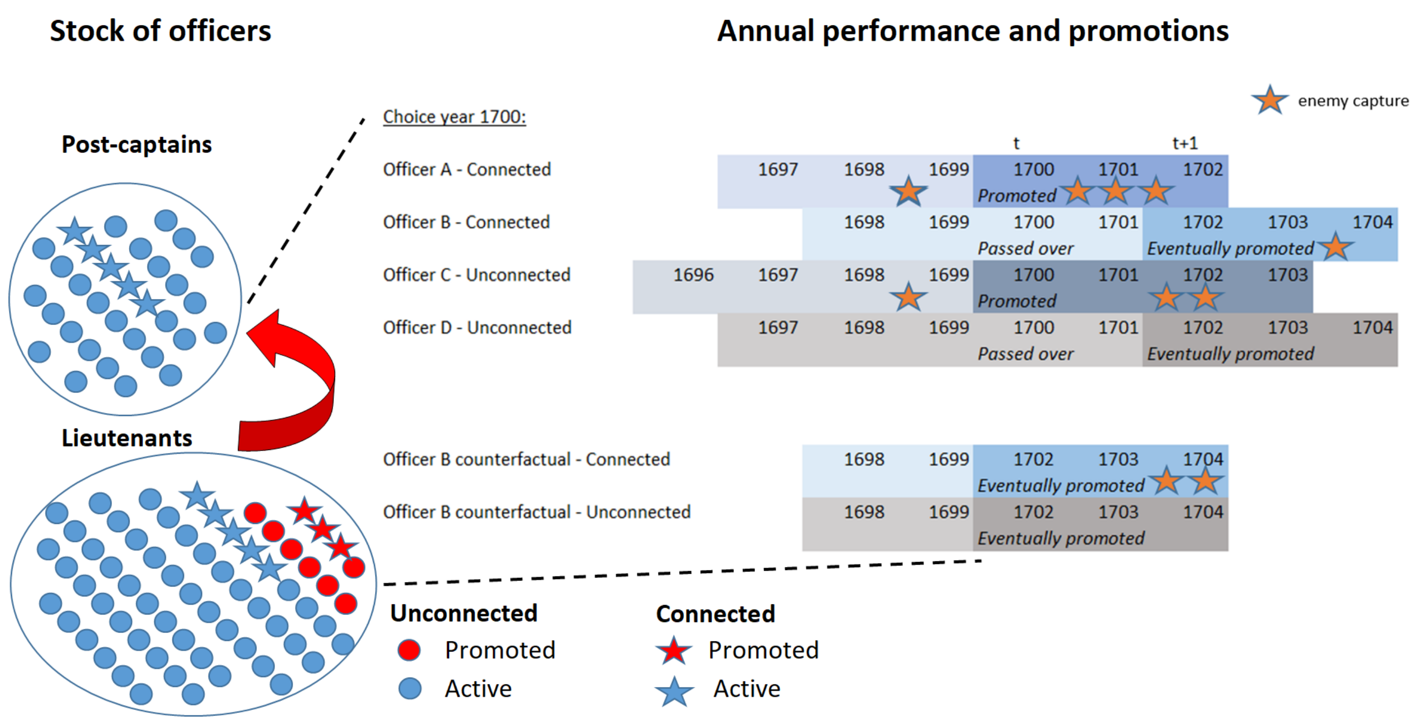


(a) By ship rate (class)

(b) By station/task

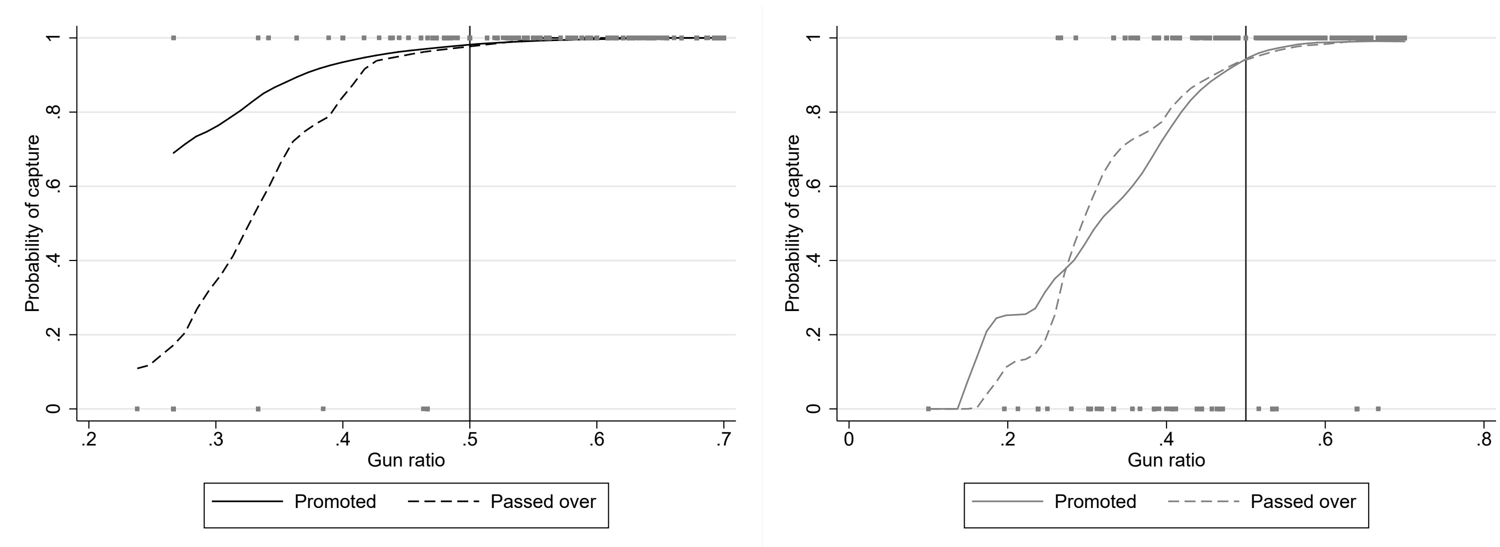
Notes: Figure shows the mean victories (as measured by the number of captures and enemy ship sinkings) per year by officers' connectedness to the Admiralty at time of promotion. Connectedness is measured as a dummy variable set to 1 if the officer shares family ties to the Admiralty (and set to 0 otherwise). Panel (a) shows the mean victory rates per year for the rating (class) of the assigned ship, where 1st rate comprises the largest ships, and 7th rate the smallest. The median gun count for 1st and 2nd rate ships is 90, and the median gun count for 7th rate ships is 16. Panel (b) shows the mean victory rates per year for each station/task.

Figure 2: Construction of counterfactual - illustration



Notes: Illustration of career progression and empirical strategy. We study the promotion of officers from lieutenant to post-captain positions. Every year, we observe the pool of all lieutenants and the entire list of post-captains. Some of these officers are connected to the Admiralty. To estimate the selection effect, we compare the (actual) performance of those promoted in a given choice-year t (Officers A and C) to those who were passed over but eventually promoted (Officers B and D). The eventual post-promotion performance at time $t+1$ (year of eventual promotion) of officers B and D serves as the counterfactual performance had they been promoted in time t.

Figure 3: Probability of victory by gun ratio for promoted vs. passed over officers, broken down by connectedness

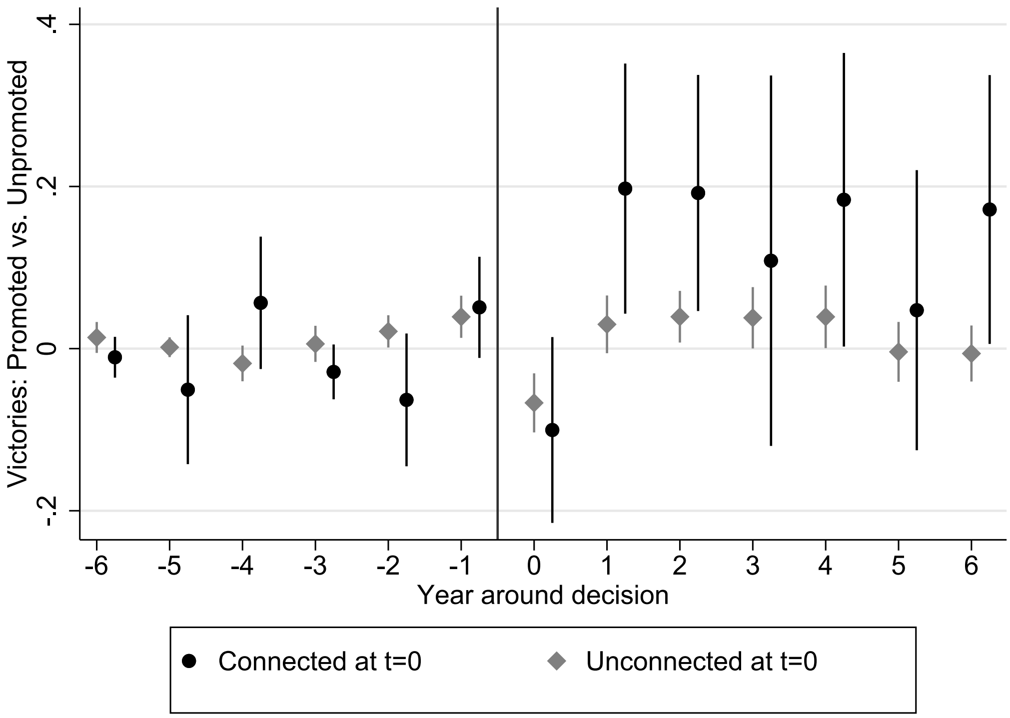


(a) Connected to Admiralty

(b) Unconnected to Admiralty

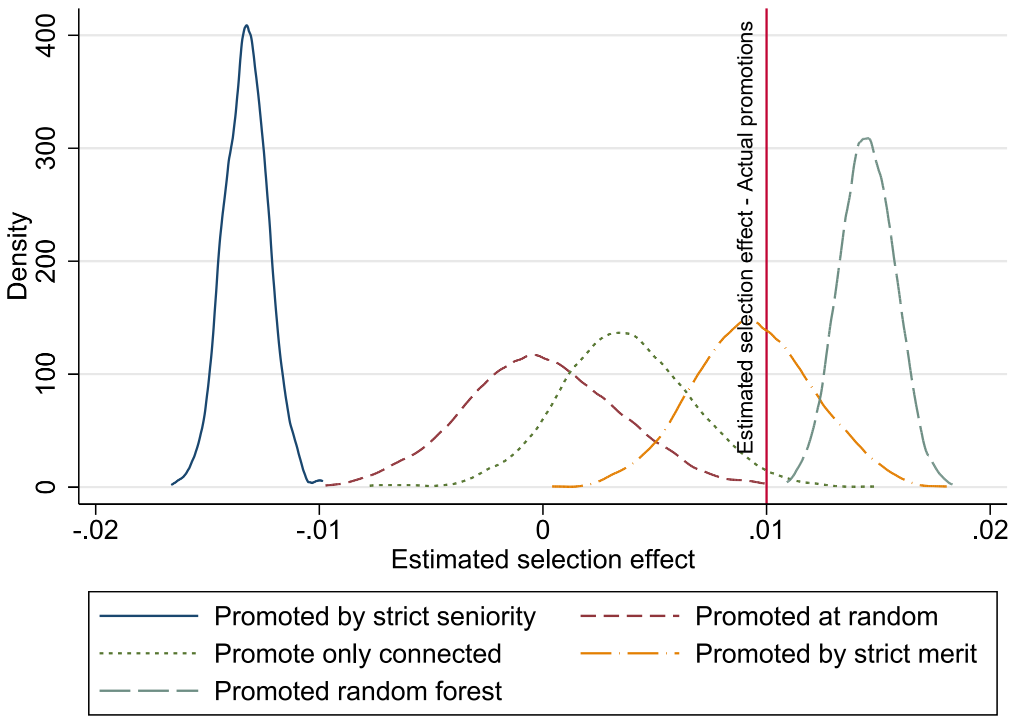
Notes: Lines are local polynomials for promoted vs. passed over officers, connected or unconnected at time of promotion. The x-axis measures the gun share (of the British ship), defined as $gunratio = guns_B/[guns_B + guns_E]$, where $guns_B$ and $guns_E$ indicate the number of guns of the British and enemy ship, respectively. A gunshare of 0.5 (solid line) indicates a duel between evenly matched battle ships.

Figure 4: Performance of promoted vs. unpromoted officers around decision year, by connectedness



Notes: Difference in victories between promoted and passed over officers during a six-year window around the year of the Admiralty decision, estimated separately for those connected and unconnected to the Admiralty at the time of decision. Treatment (Promoted) and Control (Passed over) officers in each decision-year are determined by CEM - coarsened exact matching (see Iacus et al. (2012)). We match promoted vs. passed over officers based on their pre-promotion cumulative victories (exact), the choice-year (exact), the total years of command (4 bins), pre-tenure (3 bins) and the numbers of elite and naval connections. Reporting 95% confidence intervals. Standard errors are clustered at the officer-decision year-level.

Figure 5: Selection effect under counterfactual promotion rules



Notes: The mean (and standard deviations) of the selection effects under each promotion rule are as follows. Seniority promotions = -0.0132 (0.0009); Random promotions = -0.0000 (0.003); Promote only connected = 0.003 (0.002); Merit promotions = 0.009 (0.002); Random forest = 0.014 (0.001). The solid red line marks the actual selection effect (Table 3, Panel A, column 2).

Table 1: Descriptive statistics

Panel A: Officer level	[1] Mean	[2] SD	[3] IQR	[4] Obs.
Years of service	12.54	13.25	15	5,848
Total years commanding ship	6.39	5.06	7	5,848
Number of ships commanded	3.46	3.24	4	5,848
Ship of the line	0.186	0.27	0.33	5,848
Guns	32.31	20.46	33.66	5,808
Enemy ships captured	1.04	2.23	1	5,848
Enemy ships sunk	0.02	0.18	0	5,848
Victories (capture + sunk)	1.06	2.28	1	5,848
Made post	0.53	0.49	1	5,848
Made admiral	0.03	0.17	0	5,848
Panel B: Choice year level	[1] Mean	[2] SD	[3] IQR	[4] Obs.
Number of officers	112	78	100	152
Number of promotions	18.302	18.69	25	152
Mean victories	0.126	0.16	0.16	152
Mean years commanded	1.378	0.521	0.6	152
Mean elite ties	0.285	0.122	0.16	152
Mean navy family ties	0.149	0.071	0.104	152
Mean share of connected to Admiralty	0.110	0.082	0.157	152

Notes: In Panel A, the unit of observation is the naval officer (i.e., all lieutenants, commanders, post-captains, and admirals). The sample includes all the naval officers who served during our study period of 1690–1849. In Panel B, the unit of observation is the choice-year, i.e. years between 1690-1849 in which promotions were made. We report the mean (column [1]), standard deviation (column [2]), interquartile range (column [3]), and the total number of officers (column [4]). Elite is the number of noteworthy members of the public the officer is related to. Naval family is the number of close relatives (father, father-in-law, uncle, grandfather) who were navy officers. A "ship of the line" is a large naval warship.

Table 2: Pre-promotion characteristics of promoted vs. passed over officers

	[1]	[2]	[3]	[4]	[5]
	Difference promoted vs. passed over			Diff	No.
	Full sample	Connected	Unconnected	[2]-[3]	obs.
Victories	0.259***	0.434***	0.233***	0.201***	32,716
	(0.019)	(0.062)	(0.019)	(0.066)	
Tenure	0.949***	1.142***	1.183***	-0.041	32,610
	(0.164)	(0.363)	(0.174)	(0.403)	
Years commanded	0.876***	1.091***	0.895***	0.196	32,716
	(0.041)	(0.119)	(0.044)	(0.128)	
Elite	0.035***	-0.073*	0.016**	-0.090**	32,716
	(0.008)	(0.038)	(0.008)	(0.040)	
Naval family	0.026**	0.020	0.013**	0.008	32,716
	(0.007)	(0.033)	(0.006)	(0.035)	
Connected	0.064***	-	-	-	32,716
	(0.006)				

Notes: The table compares the pre-promotion characteristics of promoted vs passed-over officers in Panel A. Panel B compares the pre-promotion characteristics of promoted vs passed-over officers and interactions with connectedness. The unit of observation is the officer $\times$ choice year. Victories are the pre-promotion number of enemy ship captures or sinkings. Tenure is the number of years since lieutenant exam. Years commanded is the number of years commanded. Elite is the number of noteworthy members of the public the officer is related to. Naval family is the number of close relatives (father, father-in-law, uncle, grandfather) who were navy officers. Promoted is a dummy that is 1 if the officer was promoted in a given choice year, and 0 if the officer was passed over (e.g., not promoted in the choice year but eventually promoted). Standard errors (in parentheses) are clustered at the officer level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Post-promotion performance of promoted officers, broken down by connectedness

Panel A:	[1]	[2]	[3]	[4]	[5]
			Victories per year		
Mean of dep. var	0.0970	0.0970	0.0970	0.0970	0.211
Promoted	0.011***	0.010***	0.005		
	(0.004)	(0.004)	(0.004)		
Connected			0.009	0.007	0.012
			(0.006)	(0.006)	(0.014)
Promoted × Connected			0.023**	0.025**	0.049**
			(0.010)	(0.010)	(0.022)
Choice year × Post-promotion year FEs	Y	Y	Y	Y	Y
War controls × Post-promotion year FEs		Y	Y	Y	Y
Years between promotions FEs				Y	Y
Sample		Full sample			Commanding
Observations	242,732	242,732	242,732	242,732	111,477

Panel B:	[1]	[2]	[3]	[4]	[5]
			Victories per year		
Mean of dep. var	0.211	0.211	0.211	0.211	0.211
Connected	0.012	0.009	0.004	-0.003	-0.005
	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
Promoted × Connected	0.049**	0.046**	0.035*	0.034*	0.033*
	(0.022)	(0.022)	(0.019)	(0.019)	(0.018)
Choice year × Post-promotion year FEs	Y	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y	Y
Years between promotions FEs	Y	Y	Y	Y	Y
Station FEs		Y	Y	Y	Y
Ship FEs			Y		
Ship × Crew FEs				Y	Y
Time-varying ship controls					Y
Sample			Commanding		
Observations	111,477	111,477	111,413	111,302	111,143

Notes: The table compares the number of victories per annum of promoted officers to those passed over (and eventually promoted) during each year after the promotion. The unit of observation is the officer × choice year × post-promotion year. The dependent variable, Victories per year, is the sum of enemy vessels destroyed or captured in a given year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. Years between promotion is defined as the difference in years between the actual year of promotion and the decision year of interest. In column (5) the sample is restricted to only those post-promotion years when officers were in command of ship. Station/task FEs are fixed effects for each assigned station (e.g., North America, Channel, Home) and task (e.g., Foreign Convoys & Cruizers). Ship FEs are fixed effects for each ship. Time-varying ship controls are: (log) ship gun count, age of the ship, dummy for whether the ship was upgraded/repaired. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Heterogeneity of selection effect by Admiralty vs. station appointment

	[1]	[2]	[3]	[4]
		Victories per year		
Mean of dep. var	0.0970	0.101	0.0789	0.0850
Connected	0.007	0.006	0.009	-0.058
	(0.018)	(0.021)	(0.027)	(0.070)
Promoted × Connected	0.025**	0.028**	0.006	0.017
	(0.010)	(0.011)	(0.017)	(0.041)
Choice year × Post-promotion year FEs	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y
Years between promotions FEs	Y	Y	Y	Y
Sample	Baseline	Admiralty appointments	Station appointments	
			All	Due death
Observations	242,732	201,843	39,446	8,211

Notes: The table compares the number of victories per annum of promoted officers to those passed over (and eventually promoted) during each year after the promotion, broken down by mode of appointment. The unit of observation is the officer × choice year × post-promotion year. The dependent variable, Victories per year, is the sum of enemy vessels destroyed or captured in a given year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. Years between promotion is defined as the difference in years between the actual year of promotion and the decision year of interest. In column 2, the sample is restricted to promotions centrally made by the Admiralty. In column 3, the sample is restricted to promotions made by station commanders. Column 4 is the subset of station appointments that were made in response to a sudden death of a local captain Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Single ship duel outcomes of promoted officers, broken down by connectedness

	[1]	[2]	[3]	[4]
	Win		Draw	Defeat
Mean of dep. var	0.656	0.656	0.246	0.0974
Promoted	-0.050	-0.051	0.070	-0.020
	(0.061)	(0.060)	(0.057)	(0.037)
Connected	0.078	0.027	0.051	-0.079*
	(0.056)	(0.057)	(0.045)	(0.046)
Promoted $\times$ Connected	0.238***	0.243***	-0.187**	-0.056
	(0.088)	(0.088)	(0.078)	(0.061)
Gun ratio		0.165***	-0.080**	-0.085***
		(0.037)	(0.033)	(0.013)
Choice year FEs	Y	Y	Y	Y
Observations	914	914	914	914

Notes: The unit of observation is the officer $\times$ choice year $\times$ single ship action. Comparing single ship duel outcomes of promoted officers to those passed over (and eventually promoted). The dependent variable Win is a dummy that is 1 if the British ship won the single ship action; Draw is a dummy that is 1 if the single ship engagement was inconclusive; Defeat is a dummy that is 1 if the British ship lost the single ship duel. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. Standard errors (in parentheses) are clustered at the officer $\times$ choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Decomposing the selection effect – Fast-tracking vs. filtering

	[1]	[2]
	Victories per year	
Fast-tracking	0.022***	-0.003
(Promoted)	(0.003)	(0.001)
Filtering	-0.012	0.002
(Promoted by merit)	(0.009)	(0.003)
Follow merit rule	0.038***	0.031***
(Promoted $\times$ Promoted by merit)	(0.014)	(0.005)
Sample	Connected	Unconnected
Observations	46,112	195,921

Notes: We regress performance of post-captains on three variables – a dummy of whether they have been promoted in accordance with the recommendation of a merit-based rule (”Follow merit rule”), the Admiralty ignored a negative recommendation of the merit-rule and promoted anyway (”fast-tracking”), or a lieutenant was passed over despite having a recommendation of the merit-rule (”filtering”). Reporting the mean and estimated standard errors based on 1,000 repetitions where ties using the merit-based rule are broken at random. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A Appendix - For Online Publication

A.1 Additional Tables

Table A1: Pre-promotion performance of those never vs. ever promoted

	[1]	[2]	[3]	[4]	[5]
		Pre-promotion officer characteristics			
	Victories	Tenure	Years commanded	Elite	Naval family
Mean of dep. var	0.182	10.23	1.758	0.179	0.0906
Never promoted	-0.066***	1.013***	0.467***	-0.209***	-0.108***
	(0.022)	(0.275)	(0.074)	(0.020)	(0.016)
Choice year FEs	Y	Y	Y	Y	Y
Observations	32,716	32,610	32,716	32,716	32,716

Notes: Unit of observation is the officer $\times$ choice year. Victories are the pre-promotion number of enemy ship captures or sinkings. Sample excludes officers who were never promoted to post-captain. Tenure is the number of years since lieutenant exam. Years commanded is the number of years commanded. Elite is the number of noteworthy members of the public the officer is related to. Naval family is the number of close relatives (father, father-in-law, uncle, grandfather) who were navy officers. Never promoted is a dummy that is 1 if the officer was never promoted to post-captain in his career, and 0 if the officer was ever promoted (both in the choice year and eventually in a later choice year). Standard errors (in parentheses) are clustered at the officer level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2: Post-promotion tenure by timing of promotion and connectedness

	[1]	[2]	[3]
	Post-promotion tenure		
Mean of dep. var	13.07	13.07	13.07
Promoted	-0.627***	-0.645***	-0.819***
	(0.178)	(0.178)	(0.205)
Connected		0.854	0.714
		(0.724)	(0.733)
Promoted × Connected			0.837**
			(0.396)
Choice year FEs	Y	Y	Y
War controls	Y	Y	Y
Observations	243,235	243,235	243,235

Notes: The table compares post-promotion years of tenure of promoted officers to those passed over (and eventually promoted) during each year after the promotion. The unit of observation is the officer × choice year × post-promotion year. The dependent variable, post-promotion tenure, is the post-promotion year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war and the total number of victories in a year. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Alternative measures of battle performance

	[1]	[2]	[3]	[4]	[5]	[6]
		Victories per year			IHS	Victories
	Baseline	≥ 1	≥ 2	≥ 3	Victories	per year
Mean of dep. var	0.0970	0.0560	0.0233	0.00931	0.0678	0.169
Connected	0.007	0.001	-0.000	0.001	0.002	0.085*
	(0.006)	(0.003)	(0.002)	(0.001)	(0.004)	(0.051)
Promoted × Connected	0.025**	0.011**	0.006**	0.003*	0.015**	0.150**
	(0.010)	(0.004)	(0.003)	(0.002)	(0.006)	(0.074)
Choice year × Post-promotion year FEs	Y	Y	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y	Y	Y
Years between promotion FEs	Y	Y	Y	Y	Y	Y
Estimation			OLS-FE			Poisson FE
Observations	242,732	242,732	242,732	242,732	242,732	139,230

Notes: Unit of observation is the officer × choice year × post-promotion year. Comparing the number of victories of promoted officers to those passed over (and eventually promoted) for each year after the promotion. Victories per year is the sum of enemy vessels destroyed or captured in a given year (column [1]). In column [2], the dependent variable is a dummy for whether the officer capture or sank any ship. The dependent variable in column [3] ([4]) is a dummy if the number of captures or sinkings exceeded 2 (3). In column [5], the dependent variable is the inverse hyperbolic sine transformed combined number of captures and sinkings. Column [6] estimates the regression model of column [1] using a Poisson fixed effects model. The variable Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. The dependent variable in column [1] is the baseline measure of battle performance. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Promotion and post-promotion performance by connectedness for switchers

	(1)	(2)	(3)	(4)
	Promoted		Victories per year	
Mean of dep. var	0.0850	0.126	0.0970	0.103
Connected in year of decision	0.068***	0.096***	0.007	-0.028***
	(0.007)	(0.014)	(0.006)	(0.010)
Promoted × Connected			0.025**	0.041**
			(0.010)	(0.018)
Data structure	Standard panel		Counterfactual performance	
Sample	Full	Switcher	Full	Switcher
Choice year	Y	Y		
Choice year × Post-promotion			Y	Y
War controls × Post-promotion			Y	Y
Years between promotions FEs			Y	Y
Observations	32,716	2,783	242,732	55,853

Notes: Unit of observation in columns 1-2 is the officer × year; the unit of observation in columns 3-4 is the officer × choice-year × post-promotion year. Relating the propensity to be promoted to connectedness (Columns 1-2) and post-promotion performance to early vs. late promotion and connectedness (Columns 3-4). Columns 1-2 are based on the officer-year-level panel, where a dummy for being promoted is regressed on connectedness in a given year, conditional on year FEs. Columns 3-4 are based on the "stacked" data structure and specification of the counterfactual performance estimation (see equation (5) of the revised paper). Columns 1 and 3 use the full sample, and columns 2 and 4 restrict the sample to only officers who experience switches in connectedness over their career. Standard errors (in parentheses) are clustered at the officer level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Main results using clustering at the officer-level

	[1]	[2]	[3]	[4]	[5]	[6]
			Victories per year			
Mean of dep. var	0.0970	0.0970	0.0970	0.0970	0.211	0.211
Promoted	0.011***	0.010***	0.005			
	(0.004)	(0.004)	(0.004)			
Connected			0.009	0.007	0.012	0.002
			(0.018)	(0.018)	(0.039)	(0.028)
Promoted $\times$ Connected			0.023**	0.025**	0.049**	0.036**
			(0.010)	(0.010)	(0.023)	(0.015)
Choice year $\times$ Post-promotion year FEs	Y	Y	Y	Y	Y	Y
War controls $\times$ Post-promotion year FEs		Y	Y	Y	Y	Y
Years between promotions FEs				Y	Y	Y
Commanding					Y	Y
Ship FEs						Y
Observations	242,732	242,732	242,732	242,732	111,477	111,413

Notes: The table compares the number of victories per annum of promoted officers to those passed over (and eventually promoted) during each year after the promotion. The unit of observation is the officer $\times$ choice year $\times$ post-promotion year. The dependent variable, Victories per year, is the sum of enemy vessels destroyed or captured in a given year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war $\times$ Post-promotion year FEs and the total number of victories in a year $\times$ Post-promotion year FEs. Years between promotion is defined as the difference in years between the actual year of promotion and the decision year of interest. In columns (5)-(6) the sample is restricted to only those post-promotion years when officers were in command of ship. Standard errors (in parentheses) are clustered at the officer $\times$ choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: War environment, timing of promotion and connectedness

	(1)	(2)	(3)
	Total victories	War	Years of war
Mean of dep. var	70.86	0.748	15.39
Promoted	4.311*	-0.003	-0.149
	(2.276)	(0.012)	(0.242)
Connected	0.352	-0.013	-1.931
	(8.423)	(0.041)	(1.253)
Promoted × Connected	-0.600	0.031	0.329
	(5.678)	(0.027)	(0.618)
Choice year × Post-promotion year FEs	Y	Y	Y
Observations	242,732	242,732	242,732

Notes: The table compares the total number of victories in a given year, the presence of war, and the years of war since post-promotion of promoted officers to those passed over (and eventually promoted) during each year after the promotion. The unit of observation is the officer × choice year × post-promotion year. The dependent variable, post-promotion tenure, is the post-promotion year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7: Selection effect by promotions made during high vs. low naval warfare periods

	(1)	(2)	(3)
	Victories per year		
Mean of dep. var	0.0970	0.123	0.0810
Promoted	0.005	0.014*	-0.007
	(0.004)	(0.007)	(0.005)
Connected	0.009	0.038*	-0.000
	(0.018)	(0.021)	(0.025)
Promoted × Connected	0.023**	0.031**	0.003
	(0.010)	(0.014)	(0.015)
Choice year × Post-promotion year FEs	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y
Sample	Full	War	Non-war
Observations	242,732	93,250	148,986

Notes: The unit of observation is the officer × choice year × post-promotion year. Comparing the number of victories of promoted officers to those passed over (and later promoted) for each year after the promotion. The dependent variable *Victories per year* is the sum of enemy vessels destroyed or captured in a given year. *Connected* is measured as connectedness to the Admiralty in the choice-year. *Promoted* is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. Column (1) shows the full sample. Column (2) restricts the sample to promotions made during periods of high naval warfare, and Column (3) restricts the sample to periods of low naval warfare. High naval warfare is defined to be periods between 1690-1849 when the number of victories (a measure of naval engagement) is 1 SD above the average. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A8: Counterfactual performance of non-commanding officers

	[1]	[2]	[3]	[4]	[5]
	Victories per year				
Mean of dep. var	0.0970	0.210	0.0970	0.636	1.174
Connected	0.007	0.005	0.007	-0.002	-0.012
	(0.006)	(0.006)	(0.006)	(0.008)	(0.014)
Promoted $\times$ Connected	0.025**	0.025**	0.025**	0.025*	0.024
	(0.010)	(0.010)	(0.010)	(0.013)	(0.022)
Choice year $\times$ Post-promotion year FEs	Y	Y	Y	Y	Y
War controls $\times$ Post-promotion year FEs	Y	Y	Y	Y	Y
Years between promotion FEs	Y	Y	Y	Y	Y
Imputed performance	n/a	Mean	Top 20%	Top 10%	Top 5%
for non-commanding officers		0.246	0	1	2
Observations	242,732	242,732	242,732	242,732	242,732

Notes: The unit of observation is the officer $\times$ choice year $\times$ post-promotion year. Comparing the number of victories of promoted officers to those passed over (and later promoted) for each year after the promotion, imputing different levels of performance for those officers not commanding ships. The dependent variable Victories per year is the sum of enemy vessels destroyed or captured in a given year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war $\times$ Post-promotion year FEs and the total number of victories in a year $\times$ Post-promotion year FEs. Years between promotion is defined as the difference in years between the actual year of promotion and the decision year of interest. Standard errors (in parentheses) are clustered at the officer $\times$ choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A9: Testing for differential station assignment by connected vs. unconnected

	(1) UK	(2) Mediterranean	(3) West Indies	(4) Mean victory rate
Mean of dep. var	0.198	0.131	0.124	0.146
Promoted	0.019***	-0.008	0.014***	-0.001
	(0.006)	(0.005)	(0.005)	(0.001)
Connected in year of decision	0.008	0.029***	-0.017**	0.004**
	(0.007)	(0.007)	(0.007)	(0.001)
Promoted × Connected	-0.014	0.002	-0.004	0.002
	(0.011)	(0.013)	(0.011)	(0.002)
Choice year × Post-promotion year FEs	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y
Observations	111,477	111,477	111,477	111,477

Notes: Unit of observation is the officer × choice year × post-promotion year. Comparing station assignment for promoted officers vs. those passed over (and eventually promoted) for each year after the promotion, by connectedness. In columns [1]-[3], the dependent variables are dummies for whether the assigned station is the Home station, Mediterranean or West Indies. In column [4], the dependent variable is the mean capture rate of the assigned station. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. The dependent variable in column [1] is the baseline measure of battle performance. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A10: Testing for differential ship assignment by connected vs. unconnected

	(1)	(2)	(3)	(4)	(5)
	Log(ship guns)	Rate	Ship age	Refit	Ship FEs
Mean of dep. var	3.678	4.551	10.53	0.0828	0.000
Promoted	0.013	-0.041*	-0.399**	-0.036***	0.047***
	(0.011)	(0.024)	(0.168)	(0.004)	(0.014)
Connected in year of decision	-0.028	0.077	-0.409	0.013	-0.029
	(0.043)	(0.093)	(0.806)	(0.016)	(0.060)
Promoted × Connected	-0.005	0.053	-0.012	0.001	0.029
	(0.022)	(0.056)	(0.462)	(0.009)	(0.041)
Choice year × Post-promotion year FEs	Y	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y	Y
Observations	109,154	109,154	109,154	109,154	109,154

Notes: Unit of observation is the officer × choice year × post-promotion year. Comparing ship quality of vessels assigned to promoted officers vs. those passed over (and eventually promoted) for each year after the promotion, by connectedness. In column [1], the dependent variable is the (log) number of total guns. In column [2], the dependent variable is the rate of the ship (1 highest, 7 lowest). In column [3], the dependent variable is the estimated ship fixed effect from a regression of victories per year on year FEs, officer FEs and ship FEs. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. The dependent variable in column [1] is the baseline measure of battle performance. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A11: Probability of victory, promoted vs. passed over by gun ratio

	[1]	[2]	[3]
		British victory	
Mean of dep. var	0.975	0.975	0.975
Own ship guns / Total guns	0.319***	0.319***	0.319***
	(0.020)	(0.020)	(0.020)
Promoted	-0.006	-0.006	-0.011*
	(0.005)	(0.005)	(0.006)
Connected		0.028***	0.025***
		(0.006)	(0.006)
Promoted × Connected			0.016**
			(0.008)
Choice year × Post-promotion year FEs	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y
Observations	10,924	10,924	10,924

Notes: The unit of analysis is the officer × choice year × capture event. *British victory* is a dummy that is 1 if the British officer captured or sunk the enemy ship. *Connected* is measured as connectedness to the Admiralty in the choice-year. *Promoted* is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A12: Balance table – Single-ship actions

	[1]	[2]	[3]	[4]
	Promoted		Diff	
	Connected	Unconnected	(1)-(2)	Obs.
Own guns	35.91	28.58	7.33***	172
			(2.58)	
Enemy ship guns	31.57	30.49	1.07	166
			(3.05)	
Ratio # own guns / # enemy guns	1.28	1.10	0.17	166
			(0.11)	
Enemy men	268.07	248.70	19.36	128
			(31.95)	
Own capture	0.083	0.088	-0.005	172
			(0.048)	
Enemy capture	0.791	0.556	0.235***	172
			(0.080)	

Notes: The unit of observation is the single-ship action. Own guns is the total number of guns for the British ship; enemy guns is the total number of guns for the enemy ship. Ratio # own guns/ # enemy guns denotes the ratio of the British/enemy gun count. Enemy men is the number of sailors staffing the enemy ship. Own capture is 1 if the British side lost the single ship engagement and was captured; enemy capture is 1 if the enemy was captured. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A13: Selection effect by degrees of separation

	(1)	(2)	(3)
	Victories per year		
Mean of dep. var	0.0970	0.124	0.124
Promoted	0.005	-0.007	0.055***
	(0.004)	(0.015)	(0.017)
Connected in decision year	0.009	0.013	
	(0.018)	(0.026)	
Promoted $\times$ Connected	0.023**	0.039**	
	(0.010)	(0.017)	
Log(Degrees of separation)			-0.004
			(0.007)
Promoted $\times$ Log(Degrees of separation)			-0.009**
			(0.004)
Choice year $\times$ Post-promotion year FEs	Y	Y	Y
War controls $\times$ Post-promotion year FEs	Y	Y	Y
Sample	Full	With shared ancestry	
Observations	242,732	70,758	70,758

Notes: The unit of observation is the officer $\times$ choice year $\times$ post-promotion year. Comparing the number of victories of promoted officers to those passed over (and later promoted) for each year after the promotion. The dependent variable *Victories per year* is the sum of enemy vessels destroyed or captured in a given year. *Connected* is measured as connectedness to the Admiralty in the choice-year. *Promoted* is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. *Log(Degrees of separation)* is the (log) average degrees of separation by blood who share common ancestry with the Admiralty. War controls include a dummy for war $\times$ Post-promotion year FEs and the total number of victories in a year $\times$ Post-promotion year FEs. Column (1) shows the full sample. Columns (2) and (3) restrict the sample to those officers who share common ancestry with the Admiralty (i.e., they are connected on the family tree with either the First Lord of the Admiralty, the Admiralty of the Fleet, or both). Standard errors (in parentheses) are clustered at the officer $\times$ choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A14: Within-officer changes in performance, by contemporaneous connectedness and promotion

	(1)	(2)	(3)	(4)
	Victories per year			
Mean of dep. var	0.0965	0.0965	0.126	0.0899
Contemporaneously connected	0.004	-0.001	0.027	-0.041
	(0.024)	(0.026)	(0.028)	(0.046)
Contemporaneously connected × Promoted		0.026	0.020	0.043
		(0.019)	(0.022)	(0.040)
Officer FEs × Choice year	Y	Y	Y	Y
Choice year × Post-promotion year FEs	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y
Sample	Full sample		Connected	Unconnected
			at time of promotion	
Observations	239,898	239,898	45,894	193,302

Notes: Unit of observation is the officer × choice year × post-promotion year. Relating performance (victories per year) to contemporaneous connectedness and whether an officer was promoted early vs. late. Contemporaneously connected is a dummy that is 1 if the officer is connected to the Admiralty in a given year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. War controls include a dummy for war × Post-promotion year FEs and the total number of victories in a year × Post-promotion year FEs. Columns [1] and [2] report the full sample results. Column [3] restricts the sample to those who were promoted while connected to the Admiralty. Column [4] restricts the sample to those who were promoted while unconnected to the Admiralty. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

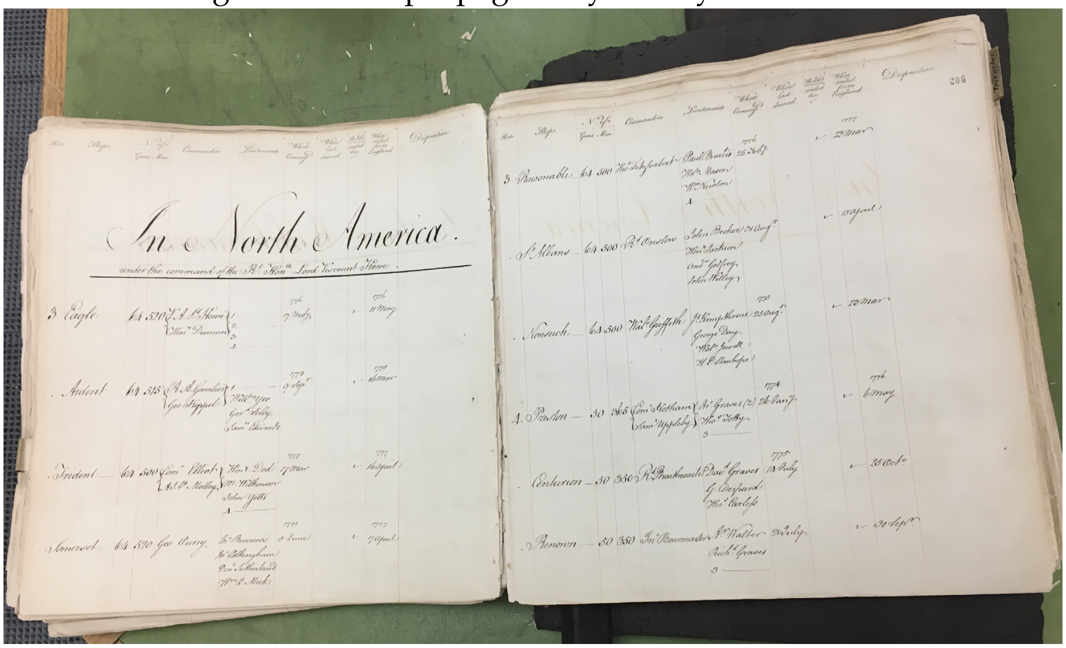
Table A15: Post-promotion performance and private information

	[1]	[2]	[3]	[4]	[5]
	Victories per year - Post-promotion				
Mean of dep. var	0.0970	0.0969	0.0970	0.0970	0.0951
Connected	0.007	0.007	0.002	0.006	-0.013
	(0.006)	(0.006)	(0.006)	(0.013)	(0.013)
Promoted × Connected	0.025**	0.022**	0.021**	0.021**	0.029**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.015)
Choice year × Post-promotion year FEs	Y	Y	Y	Y	Y
War controls × Post-promotion year FEs	Y	Y	Y	Y	Y
Time between promotions FEs	Y	Y	Y	Y	Y
Pre-promotion capture FEs		Y	Y	Y	
Pre-promotion tenure and command FEs			Y	Y	
Number of elite and naval ties FEs				Y	
CEM					Y
Observations	242,732	242,683	241,331	241,331	129,976

Notes: The unit of observation is the officer × choice year × year after promotion. Comparing the post-promotion victories of promoted officers to those passed over (and eventually promoted) for each year after the promotion. The dependent variable, Victories per year, is the sum of enemy vessels destroyed or captured in a given year. Connected is measured as connectedness to the Admiralty in the choice-year. Promoted is a dummy set to 1 if the officer was promoted in the year of choice, and 0 if the officer was not promoted in the given year but promoted later. In Column 5, treated and control units are determined by CEM - coarsened exact matching (Iacus et al., 2012). Details of our implementation are explained in subsection 5.3. Standard errors (in parentheses) are clustered at the officer × choice year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

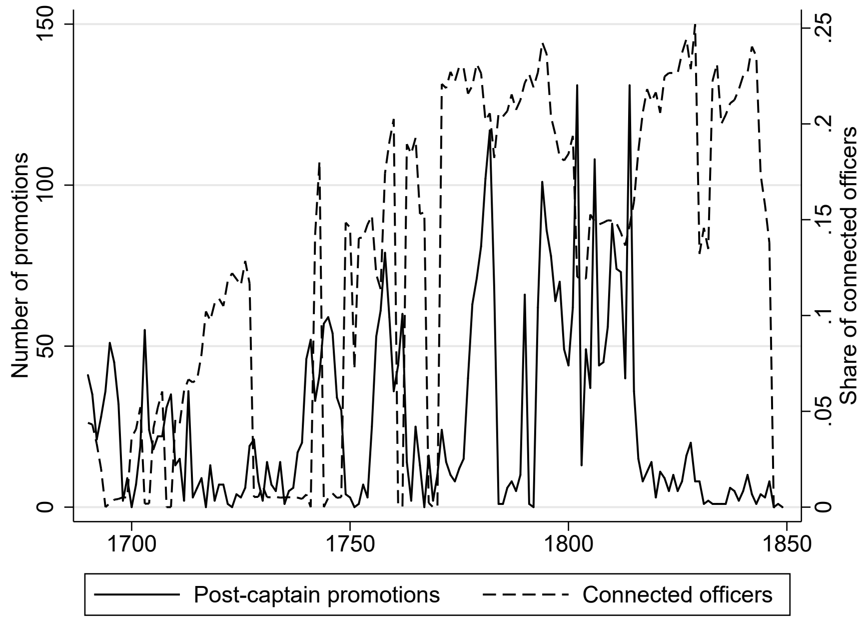
A.2 Appendix Figures - For Online Publication

Figure A1: Sample page - Royal Navy station lists



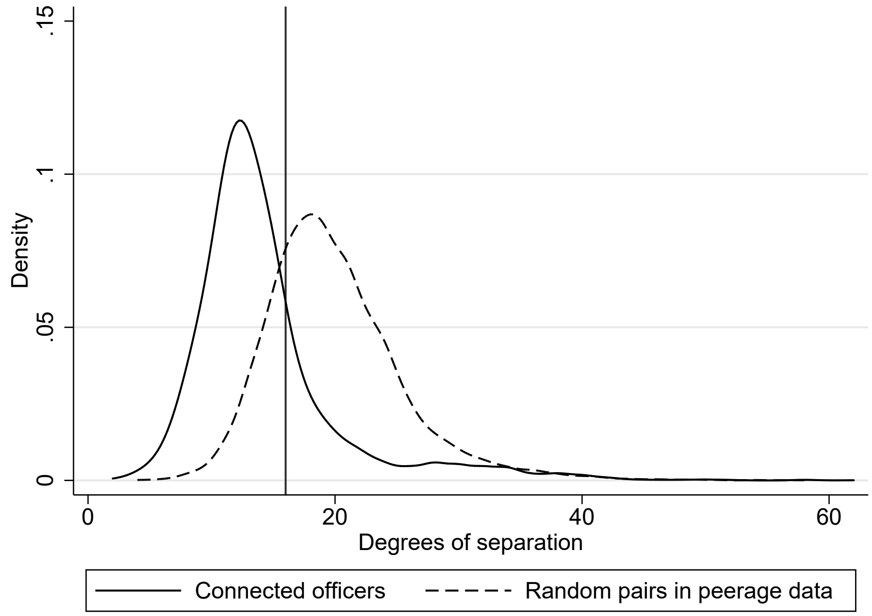
Notes: Sample of a page from the Admiralty Lists ("The present disposition of his Majesty's Ships and Vessels in Sea Pay") from 1778 (ADM 8), available at National Archives, Kew.

Figure A2: Promotions to post-captain and share of connected officers



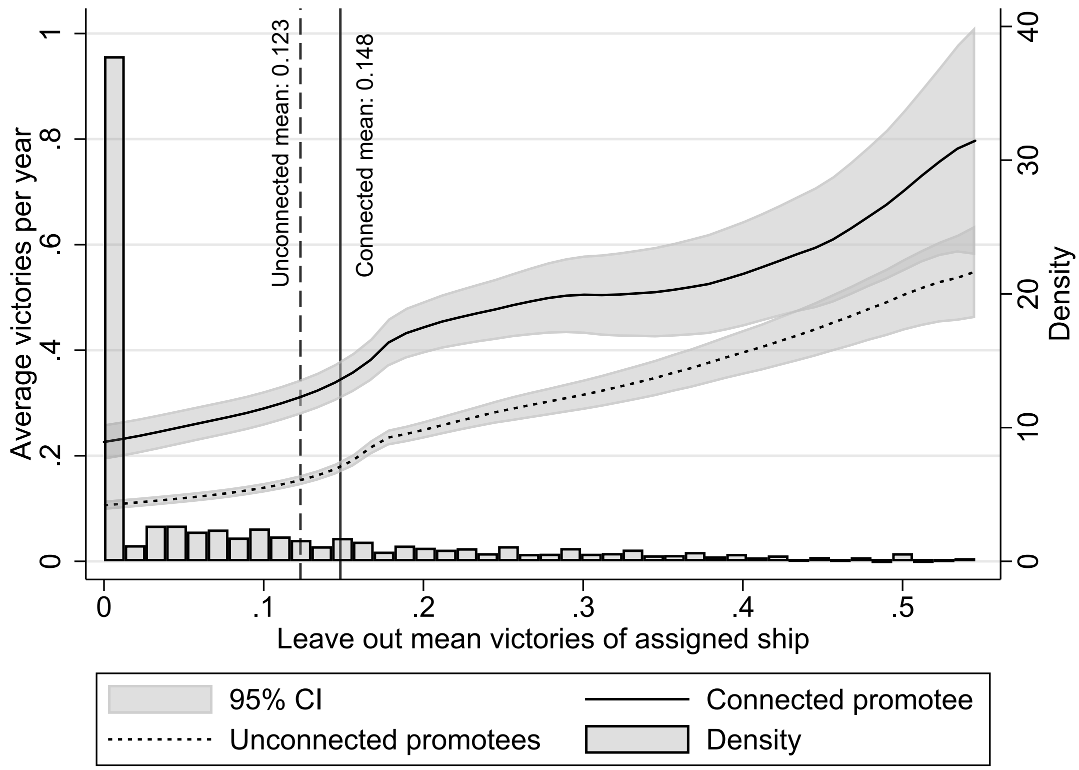
Notes: The figure shows the total number of post-captain promotions (solid line, left y-axis) and the number of connected officers (dashed line, right y-axis) over time.

Figure A3: Degrees of separation in the peerage dataset and among naval officers



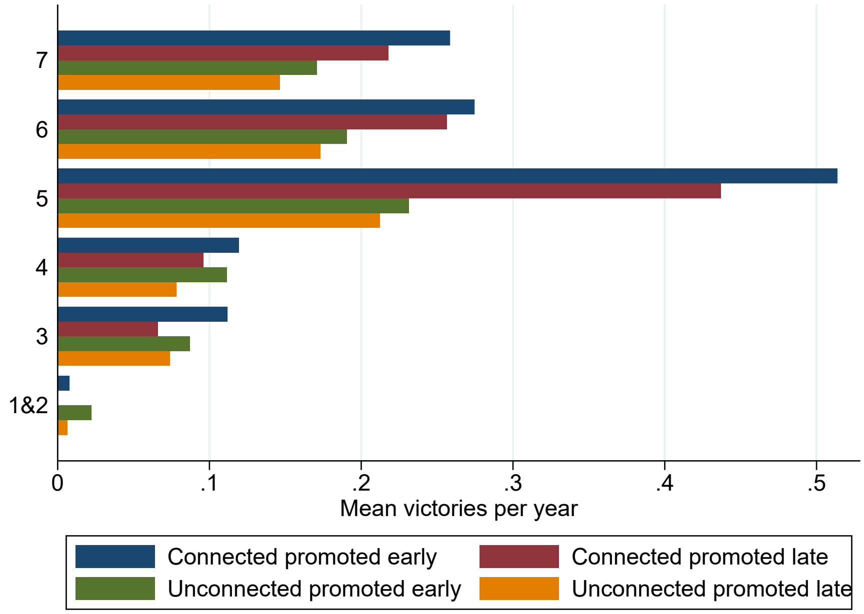
Notes: The dashed line indicates the distribution in the degrees of separation between two randomly chosen people in the peerage dataset; the solid line shows the distribution between *connected* naval officers and admirals. The distribution for naval connections is shifted markedly to the left, indicating that naval connections are relatively close. The graph illustrates that 16 degrees of separation (vertical line) indicates relatively close connections.

Figure A4: Performance and ship FEs by connectedness at time of promotion



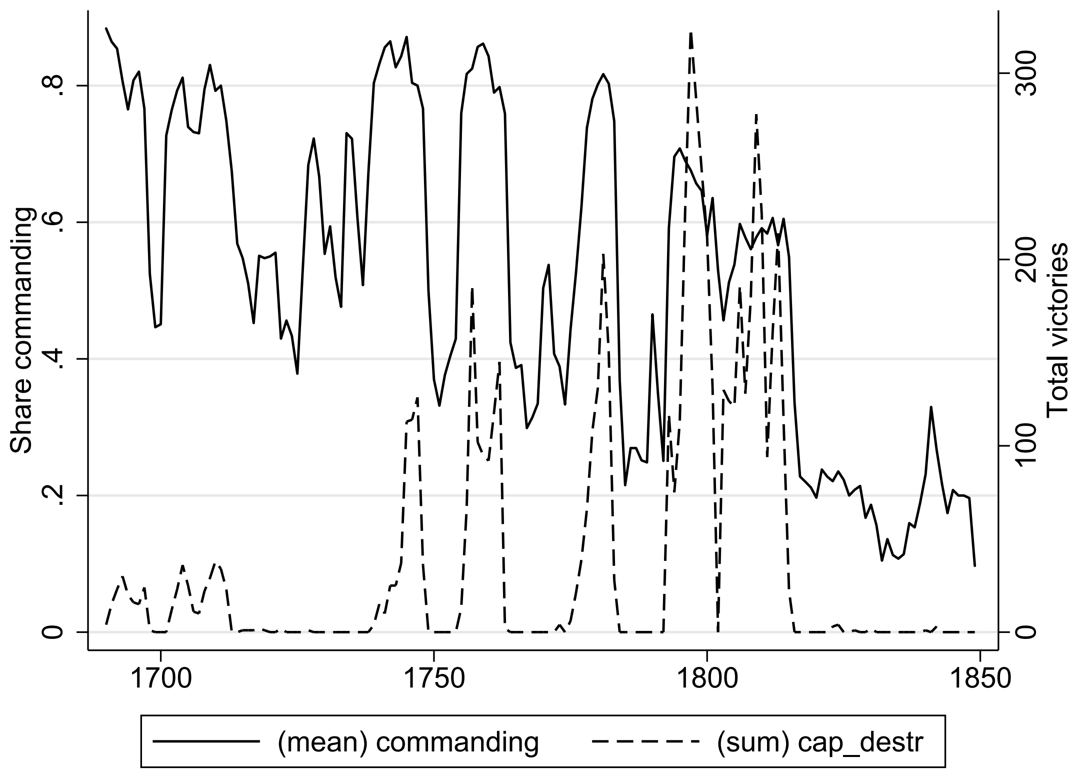
Notes: Figure shows the number of victories per year as a function of the assigned ship's mean performance, broken down by whether the officer was promoted while connected to the Admiralty or not (leaving out the years of service under the same officer).

Figure A5: Average performance of captains, by connectedness and timing of promotion



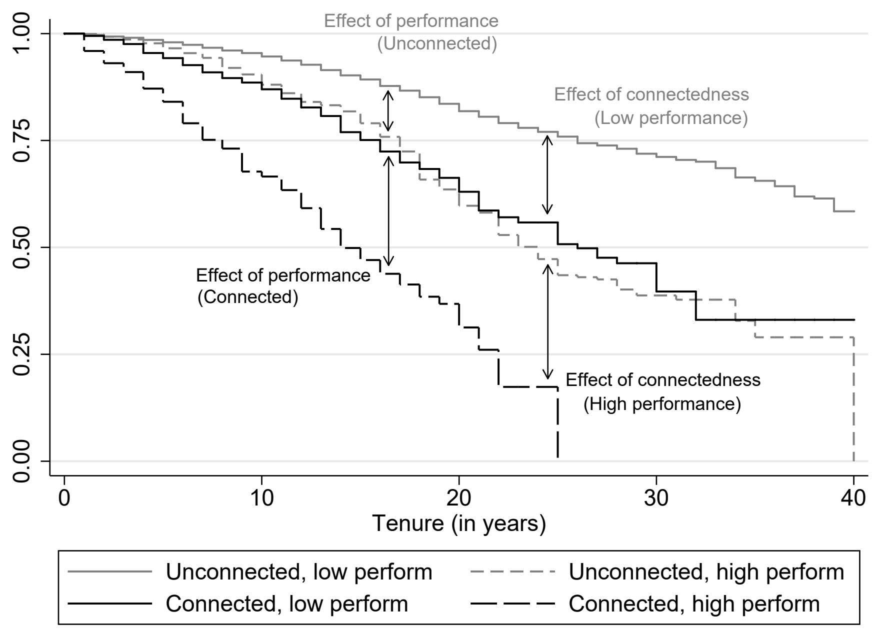
Notes: Figure shows the mean number of victories per year by the ship rate (1=highest rate/biggest ship, 7=lowest rate/smallest ship), broken down by whether the commanding officer was connected or not at time of promotion, and whether the commanding officer was promoted early or late.

Figure A6: Share of post-captains commanding and total victories



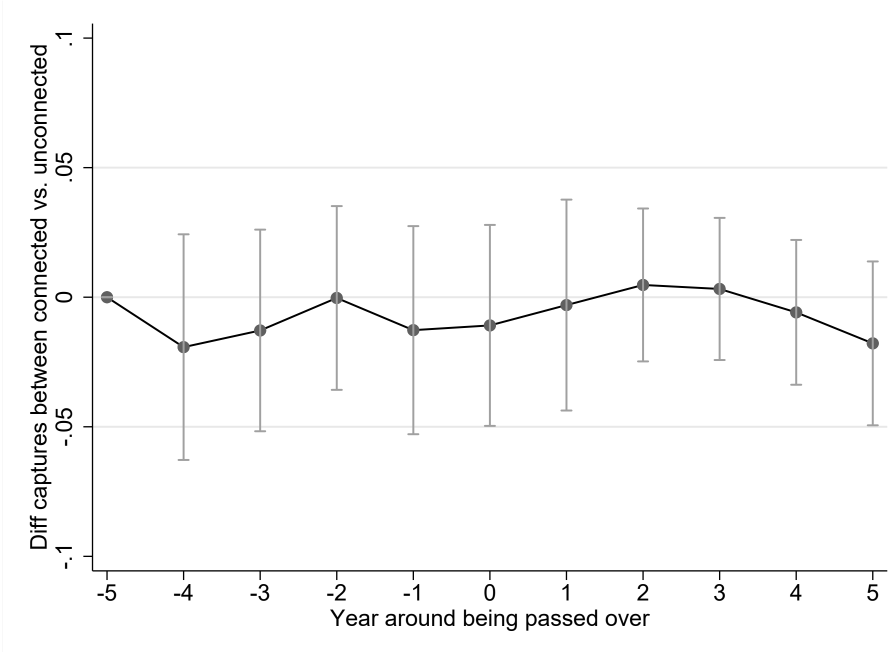
Notes: Figure shows the share of officers commanding a ship and the total number of victories over time.

Figure A7: Promotion hazard rates by performance and connectedness



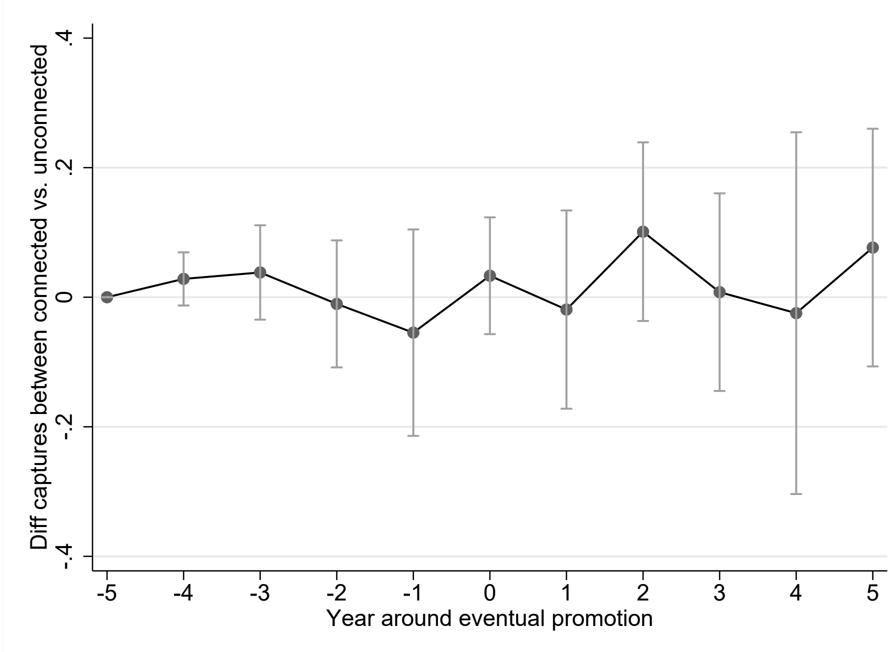
Notes: Reporting the Kaplan-Meier survival estimates for promotion to post-captain (event) as a function of tenure (time), broken down by connectedness to the Admiralty and high/low performance. High performance is defined as having captured or sunk more than 1 enemy ship.

Figure A8: Differential contemporaneous effect of being passed over – By connectedness



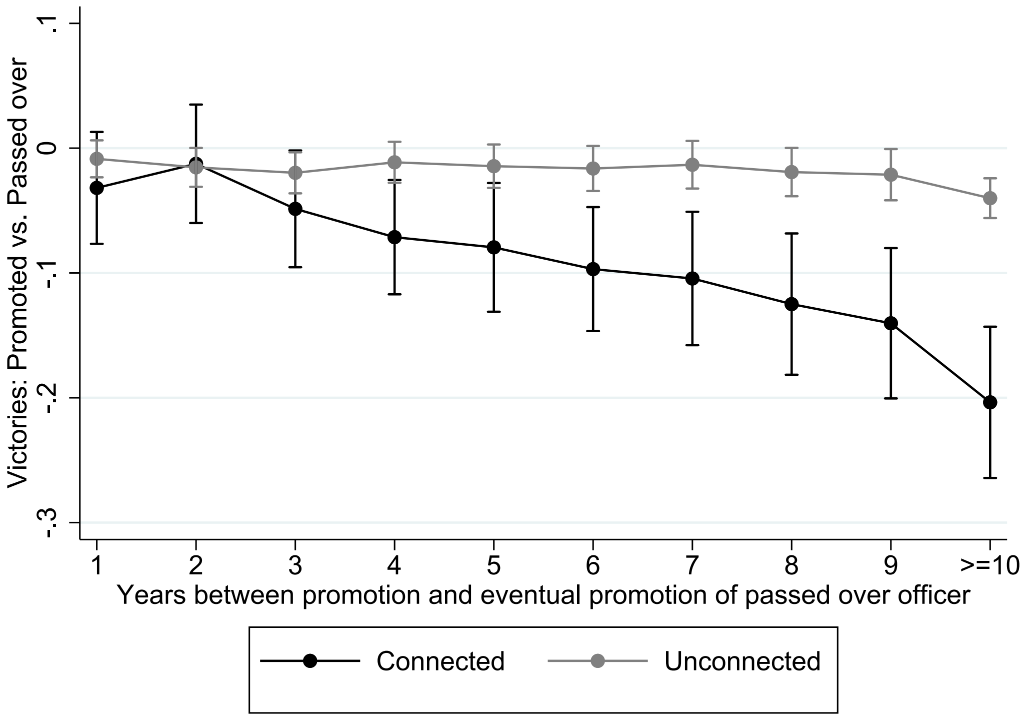
Notes: This figure shows the differential contemporaneous effect of being passed over between connected vs. unconnected officers for years around the passing over event (centered around 0). For each decision year, we restrict the sample to those officers who were passed over. The coefficients thus show the performance difference between those connected vs. unconnected in the decision year (i.e. the year they were passed over), around the event of being considered but passed over. Reporting 95% confidence intervals. Standard errors are clustered at the officer-decision-year-level.

Figure A9: No differential pre-trend before eventual promotion – By connectedness



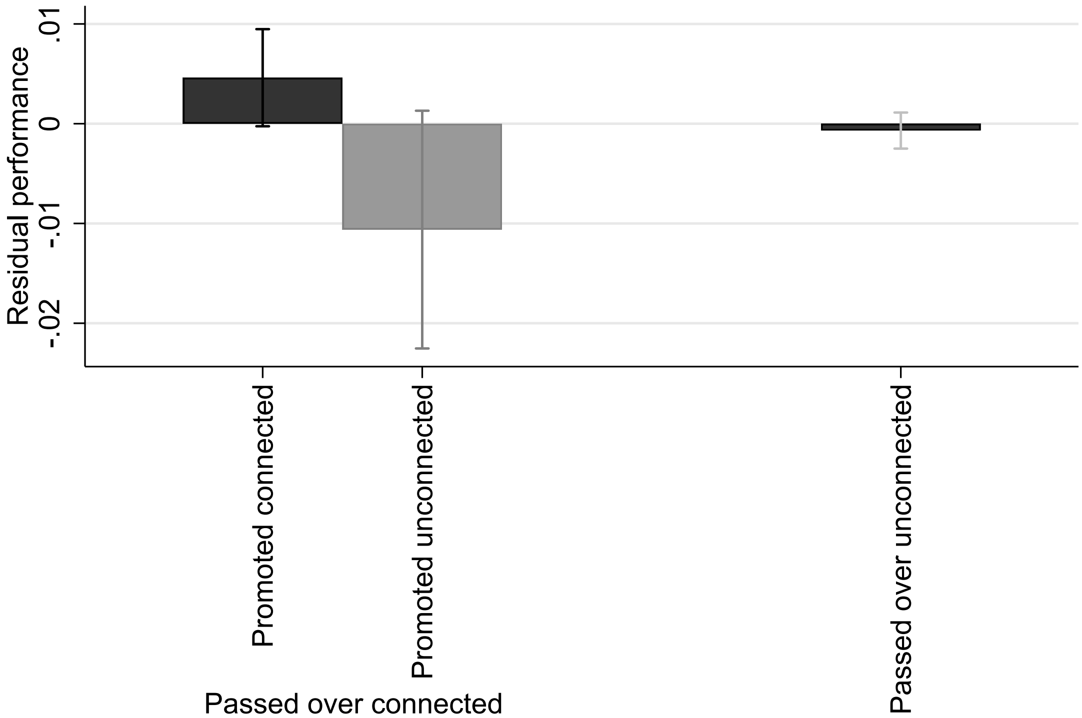
Notes: This figure shows the differential effect of being promoted between connected vs. unconnected officers for officers who were passed over, for years around the eventual promotion event (centered around 0). Reporting 95% confidence intervals. Standard errors are clustered at the officer-decision-year-level.

Figure A10: Post-promotion performance of promoted vs. passed over officers by years between immediate and eventual promotion, broken down by connectedness



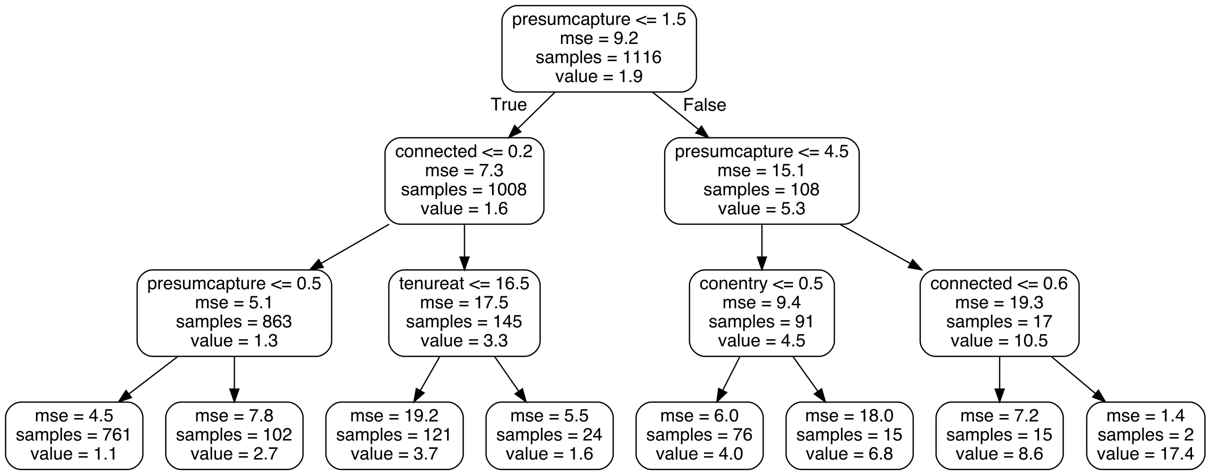
Notes: Post-promotion difference in victories between promoted vs. passed over officers (i.e. the selection effect) by years between immediate and eventual promotion, broken down by connectedness to the Admiralty. All coefficients are relative to the immediate promotion in a choice year. The sample is restricted to those always connected (connected at time of decision and time of promotion) and never connected (unconnected at time of decision and time of promotion). The estimates are conditional on commanding and including ship FEs (Table 3, column 6). Reporting 95% confidence intervals. Standard errors are clustered at the officer-decision year-level.

Figure A11: Post-promotion performance for officers passed over and eventually promoted, by connectedness



Notes: Showing mean residual post-promotion performance for officers passed over and eventually promoted, by connectedness. The data structure and estimation follow equation (5), now partialing out choice year $\times$ post-promotion year FEs, war controls $\times$ post-promotion year FEs, and the years between promotions FEs. On the left of the figure, the sample is restricted to those who were passed over connected but subsequently promoted connected (dark gray bar) or unconnected (light gray bar). On the right of the figure, we show the mean post-promotion performance of those who were passed over unconnected and eventually promoted (either connected, or unconnected). Reporting 95% confidence intervals, with standard errors clustered at the officer $\times$ choice-year level.

Figure A12: Decision tree - example



Notes: The figure shows predicted values for the post-promotion capture performance of Royal Navy captains. Each bifurcation is a binary decision, based on a single variable's parameter. The algorithm attempts to match the data as closely as possible, searching for decision variables and parameters that minimize the mean squared error (mse0). In this example, officers with a pre-promotion capture rate >4.5, and with a high degree of connectedness to the admiralty (above 60% of the time), have an expected capture rate post-promotion of 17.4 enemy ships; those who captured only one before promotion and were not connected more than 20% of the time, went on to an average of ”only” another 2.7 victories.