

**MERITOCRACY VERSUS THE MARKET:  
SIGNALLING AND SCREENING IN STAFFING THE BRITISH ARMY OFFICER CORPS**

Esther Redmount, Colorado College

Arthur Snow, University of Georgia

Ronald S. Warren, Jr., University of Georgia

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**I. Introduction**

Prior to November 1, 1871, young men who wanted to be officers in the British Army could purchase their regimental commissions, buying in at the bottom rung (ensign) of the promotion ladder and moving up through the ranks by purchasing subsequent commissions.<sup>1</sup> When this purchase system was abolished, the highest rank for sale was lieutenant colonel. Men were promoted beyond that rank only through seniority, merit, or political influence. The rank of colonel of a regiment or a position on the General Staff of the Army was the pinnacle of a military career. At the end of his career, an officer would sell his regimental commission to finance his retirement. Pensions were also available during this period, but only to those with twenty or thirty years of service. For most officers, selling one's commission to fund retirement was a much more practical choice.

The market for commissions came into being at the time of the Restoration. Public opinion held that there was little need for a standing army. Armed forces were expensive and unruly, and vesting power in any group other than a small military elite (who would serve for chivalrous rather than pecuniary reasons) violated and undermined social and

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<sup>1</sup> Some commissions were always available without purchase, through battlefield promotions, to graduates of the Military Academy, or by the decision of the Commander-in-Chief for meritorious candidates. See War Office 74 (WO74/194). Many of the details which follow come from "Minutes and Appendices" of the Over-Regulation Commission, May 1870.

economic hierarchies. Selling commissions to staff an army was thought to be a way to limit the officer corps to “noble menne and gentlemen of great revenues.”<sup>2</sup>

Abuses of the purchase system, as well as a desire to promote some men whose personal resources were inadequate to finance the purchase of a commission, impelled authorities to attempt to control the unregulated sale and purchase of commissions.<sup>3</sup> The crown, in general, reserved the right to promote whomever it wished. Because the crown also wished to exercise some control over who rose through the ranks, purchases and sales of commissions had to be approved by commanding officers and the War Office. Technically, successors to any position were appointed by the Commander-in-Chief, although in practice individuals were almost always able to transfer their commissions as promised to buyers.

The crown also attempted over a period of 150 years to fix the prices of Army commissions by rank. Despite warnings that sales at prices greater than the legal tariff would not be sanctioned, this price fixing was generally unsuccessful. Officers circumvented price regulations and the prohibitions against naming their successors by selling their commissions to brokers.<sup>4</sup> The crown responded with a series of regulations on

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<sup>2</sup> Lois G. Schworer, *No Standing Armies: The Anti-Army Ideology in Seventeenth Century England*, Baltimore: Johns Hopkins University Press, 1974, p. 13. See also John Brewer, *The Sinews of Power: War, Money and the English State, 1688-1783*, London: Unwin Hyman, 1989, pp. 29-88, for a discussion of the British Army in the eighteenth century.

<sup>3</sup> Abuses of the system were widely discussed, and occasionally ridiculed. For example, aristocratic families purchased commissions for their children. From the *Morning Post and Fashionable World*, July 21, 1796, came this report: “Two majors and a Colonel dined together yesterday at St. James Coffee House, whose ages united just amounted to forty seven years!” However, Brewer believes such extreme abuses were not commonplace.

<sup>4</sup> One of many advertisements during the period appeared in the *Morning Post and Fashionable World*, June 23, 1801, as follows: “Cornetcy of Dragoons, A Gentleman about to Retire from the Service has permission to nominate a Successor to one of the Best Regiments in the King’s Service; he must be of unexceptional character, good family and have a small independence. Apply personally or by letter post-paid with real name and address to C.C. at No. 6 Northumberland, Strand.”

the brokerage of commissions, but these were also held to be unsuccessful.<sup>5</sup> On the eve of the demise of the purchase system, about 20% of all officers had obtained their commissions by purchase and, according to War Office records, had paid well in excess of the regulated prices for them (WO 74/194).

In 1871, the Cardwell Reforms brought an end to the purchase system. The Army Purchase Commission (APC) was charged with buying back outstanding commissions, and was instructed to pay both a regulation price and an over-regulation price. Regulation prices presented no difficulties but over-regulation prices, being explicitly illegal, were another matter. The APC relied on officers to provide evidence of what they had paid for their commissions and then used that evidence in a novel way. The APC created an “average” over-regulation price for each regiment, and offered the petitioner the regulation price and that average. Extant War Office records contain the correspondence between the APC and the officers. That correspondence details the bargaining that ensued in many cases. The War Office was determined not to pay “fancy prices,” while the officers were determined to be fully reimbursed for what they had spent on their commissions. A court case in 1874 and several other Royal Warrants were necessary to resolve some of these conflicts.

As an organ of the state, the British Army of the nineteenth century had both a defensive role and an imperialistic one. Demonstrating positive outcomes for the assigned tasks related to those goals was the *sine qua non* for an officer to attain the next rank in his regiment or hope for preferment to the General Staff. Presumably, a prospective officer knew his capabilities in a military setting better than the authorities who recruited him.

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<sup>5</sup> In 1807, these and various other regulations, promulgated through Royal Warrants, were formalized in the Mutiny Acts of that year (47 Geo.3, c32, s.97). Fines for treble the amount of the over-regulation payment could be imposed.

The commissioned officer corps of the British Army constituted a job ladder with few ways of discerning whether a newly recruited ensign was going to be an effective leader.

The search for meritorious officers was urgent, and for most of the nineteenth century it was still heavily bound up with class.<sup>6</sup> Observable and reliable predictors of future performance in the officer corps were not widely available at the time.<sup>7</sup> Officers were recruited disproportionately from high socio-economic-status groups. Aristocrats and gentry were highly sought for these positions because it was thought that their upbringing prepared them especially well for military life and, moreover, many people attributed higher moral character to the upper classes.

By the middle of the nineteenth century, however, even the most hide-bound observers had to acknowledge that able young men of good character and high ability might come from the middling classes and, at the same time, not all members of the aristocracy were good officer material. Still, the stakes were high even if they were not easily measured. Results could be disastrous for a corps or a regiment if an inept officer was put in charge. An able, brave, intelligent officer could turn the tide of any military engagement, bringing success to the endeavor and prestige to himself and his unit. Perhaps contemporary authorities could judge socio-economic class (as a proxy for ability) by speech or by clothing, but those markers have not survived in the historical record. What does survive is the decision to purchase a commission.

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<sup>6</sup> See Simon Heffer, *High Minds: The Victorians and the Birth of Modern Britain*, London: Windmill Press, 2012, especially Ch. 13, "The End of Privilege: Inventing the Meritocracy," pp. 469-505.

<sup>7</sup> See Douglas W. Allen, "Compatible Incentives and the Purchase of Military Commissions," *Journal of Legal Studies* 27 (January 1998), pp. 45-66, especially p. 53. For example, the military academy at Sandhurst was not established until 1801. Although the Royal Military Academy in Woolwich was founded earlier, in 1741, it trained only for positions in the artillery and engineer officer corps, which could not be purchased.

Given informational asymmetry regarding one's ability as a military officer, which was presumably most pronounced at the entry level of ensign, we hypothesize that the purchase of an Army commission served as a signal of underlying ability, either passively as part of an implicit screening mechanism or actively as a signaling device. In either case, the payoff to purchasing a commission was a higher likelihood of promotion. If, *ceteris paribus*, the purchase of an ensigncy shortened the length of time *served* in the next rank (lieutenant), then we interpret this result as evidence of screening. On the other hand, if the purchase of a rank hastened advancement *to* that rank, then we interpret this outcome as evidence of signaling.

We test for screening and signaling with data drawn from the archives of the British War Office and *Hart's Annual Army List*. We have observations, at the time of the abolition of the purchase of commissions, on the time spent in each rank up to lieutenant colonel, whether or not ranks previously held had been purchased, indicators of bravery, distinction, or other meritorious service, the location of service, whether the officer was of aristocratic lineage, and whether or not the officer was a veteran of the Crimean War. We estimate a survival function determining the time in rank as a lieutenant (captain), defined in the data as the elapsed time between promotion to lieutenant (captain) and promotion to captain (major) as a function of the above-mentioned covariates.

Preliminary estimates reveal evidence consistent with the prediction that purchases of commissions at the ranks of ensign and major acted as indicators of high ability. The length of time to promotion from lieutenant to captain was shorter for those who had purchased an entry-level commission to the ensigncy, consistent with a screening interpretation of that decision: Those with high ability bought an ensign's commission expecting that, upon promotion to lieutenant, they would advance relatively quickly to a captaincy with its much higher wage. The length of time to promotion from captain to

major was shorter for those who had purchased a major's commission, consistent with a signaling interpretation of that decision to purchase. Those with high ability signaled to commanders that they would perform successfully as majors by purchasing that commission. Unlike the case of screening, however, in the case of signaling the decision to purchase a commission is assumed to be informative for commanders and thereby led to statistical discrimination.

## **II. The Model**

Our empirical analysis is motivated by the model of job advancement developed by Bjerck (2008), in which entry-level workers know their abilities but employers cannot initially distinguish those with high ability from those with low ability.<sup>8</sup> Since all workers are assumed to be equally productive at entry-level jobs, promotion to the next job level cannot be predicated on performance. The only way to secure promotion out of an entry-level job in Bjerck's model is by actively signaling that one has high ability. As a result of this signaling, statistical discrimination is evident in the make-up of the workforce at the second job level. Thereafter, on-the-job performance is a sufficient statistic for further promotions. Two identifiable groups are posited that differ with respect to the proportion of those with high ability in each group. As a consequence, the signal is noisy but sufficiently informative to be useful as an indicator of ability. In equilibrium, wage payments are tied to jobs, and sufficiently meritorious job performance leads to promotion and a higher wage.

Several features of the British Army officer corps conform to the assumptions of this model. First, in the Army's pay structure of that period, officers' wages varied by rank, but not by regiment or by individual. Second, the data allow us to distinguish between aristocrats and all other officers, two groups likely to have different distributions of ability.

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<sup>8</sup> See David Bjerck, "Glass Ceiling or Sticky Floors? Statistical Discrimination in a Dynamic Model of Hiring and Promotion," *Economic Journal* 118 (July 2008), pp. 961-982.

Third, an officer accumulated no record of accomplishment at the lowest rank of ensign, as these officers either failed miserably and were cashiered, or they succeeded and advanced to the rank of lieutenant. Evidence that having purchased a commission hastened promotion to that rank would be consistent with Bjerck's model of job advancement under asymmetric information, with the purchase decision serving as a signal of high ability.

The purchase of commissions was one way to enter the officer corps and advance through the ranks of the British Army during the nineteenth century, but it was not the only way. One could secure an appointment at the lowest rank of ensign without purchase by graduating from a military academy or by registering with a broker who, for a fee, provided information about vacancies for those who were unable to purchase an ensign's commission. When vacancies opened at the lieutenant rank, it was not uncommon for ensigns who had not purchased their current commission to purchase the lieutenant commission but none thereafter. Once having attained the rank of lieutenant, an officer began to accumulate a record of performance that would help inform the decision of his superiors regarding his fitness for subsequent promotions.

While the purchase of a commission was a direct means of gaining higher military rank, we hypothesize that it also served in an informational capacity. If ability as a military officer were an observable trait, then those with high ability would be assigned to the rank of their highest value to the British Army at the time of their appointments. Assuming that, after several hundred years of experience, the Army set wages and promotion guidelines optimally, purchasing commissions would in that case be of no informational value. However, when ability is not observable and performance is not very informative, the purchase of a commission could have played a role in screening candidates or provided a means for candidates to signal their high ability.

In particular, it should have been more profitable for young men better suited to the officer corps, whether they were from the aristocracy or not, to purchase the ensigncy because they expected to advance more quickly through the ranks than those not as well-suited. The implicit contract combined the purchase of an ensign's commission with a shorter time in lieutenantancy. Evidence of this outcome in the data would be consistent with a screening role in the decision to purchase an ensign's commission.

Once the first promotion to lieutenant was achieved, performance in that rank was undoubtedly an important determinant of subsequent promotions. However, if performance was not a sufficient statistic, then the decision to purchase a higher rank could serve as a bonding device whereby those of high ability signaled their fitness for performing successfully at that next rank. If those who had purchased a higher rank advanced out of the lower rank more quickly than those who did not, then the decision to purchase the commission played an active signaling role in advancing high-ability officers. Evidence to this effect would indicate the presence of statistical discrimination in the makeup of the higher rank.

### **III. Empirical Strategy**

In the present context, the decision to buy an Army commission can be interpreted either as an active (and costly) signal by high-ability individuals of their extraordinary promise as an officer or as a passive element of a screening strategy of the Army command. The principal prediction of the model is that the probability of promotion to the next rank will depend positively on the presence of such a signal. Our data provide an opportunity to distinguish between, and test for the presence of, signaling and screening behavior in the career dynamics of officers in the British Army in the era of market-determined commissions.



The specification of an empirical model of time in rank requires the derivation of an expression for the hazard function or, alternatively, the survival function. We use a subsample of individuals who had attained the rank of lieutenant colonel, the highest rank which could be purchased. On the date when the purchase of commissions was abolished and buyouts commenced, time in the rank of lieutenant colonel for these officers was, of course, ongoing (incomplete) or right-censored. However, time spent in the lower ranks was complete or uncensored. We first specify a general model that allows for the presence of right-censored (uncompleted) time in rank, and derive the log-likelihood function for a parametric survival function. We then set the censoring parameter to one in order to model the completed time in the lower ranks observed in our sample.

Let  $R_j$  denote the completed length of time spent in rank  $j$ . (Henceforth, we drop the rank subscript for notational convenience.)  $R$  can be characterized alternatively (but equivalently) by any one of three related probability functions: the probability density function  $f(t) = \Pr(R = t)$ , which gives the probability that time in rank equals  $t$ ; the survival function  $S(t) = \Pr(R \geq t)$ , which determines the probability that time in rank is of at least length  $t$ ; and the hazard function  $H(t) = f(t)/S(t)$ , which gives the rate at which an officer is promoted to the next rank at time  $t$ , given that the length of his time in the current rank is  $t$ .

Although a number of statistical distributions can be specified to represent these probability functions, we use the commonly adopted Weibull distribution to allow the probability of promotion to the next rank to vary over time in rank. The hazard function for the Weibull distribution is

$$H(t) = \lambda P(\lambda t)^{P-1}$$

where  $P$  is the "shape" parameter and  $\lambda$  is the "scale" parameter. When  $P = 1$ , the Weibull hazard function reduces to the special case of an exponential hazard, which exhibits a constant "escape" or promotion rate  $\lambda$ . Thus, the Weibull hazard generalizes the

exponential model by allowing for positive ( $P > 1$ ) or negative ( $0 < P < 1$ ) dependence of the promotion rate on time. With the addition of a set of time-invariant explanatory variables  $X$ , the hazard function associated with the Weibull distribution becomes

$$H(t;X) = \lambda(X; \beta)P[\lambda(X; \beta)t^{P-1},$$

where  $\lambda = \exp(-X\beta)$ , and  $\beta$  is a vector of coefficients to be estimated. The time spent in rank is most naturally expressed in terms of the survival function, which is given by

$$S(t;X) = \exp\{-[\lambda(X; \beta)t]^P\}.$$

Let  $\sigma = 1/P$ , and define a dummy variable  $\delta = 1$  if time in rank is complete at the date of the abolition of commission purchase and  $\delta = 0$  if time in rank is ongoing (or censored).

We introduce a change of variable such that

$$v = P \log_e[\lambda(X; \beta)t] = 1/\sigma(\log_e t - X\beta),$$

where the probability density function for  $v$  is

$$f(v) = (1/\sigma)\exp(v - e^v),$$

and the survival function is

$$S(v) = \exp(-e^v).$$

The log-likelihood function is

$$\log_e L = \Sigma [\delta \log_e f(v) + (1 - \delta) \log_e S(v)]$$

$$\log_e L = \Sigma [\delta(v - \log_e \sigma) - e^v],$$

which is maximized to obtain solution values for  $P = 1/\sigma$  and  $\beta$ . Because our sample of lieutenant colonels includes only those with completed time in the ranks of lieutenant and captain when the purchase of commissions was abolished,  $\delta = 1$ .

#### **IV. Data**

The focus of our analysis is the time spent in the ranks of lieutenant and captain. When a young man was notified of his initial appointment, it was posted to the *Army and*

*Navy Gazette* and then he joined his regiment. All subsequent promotions or exchanges and eventual retirement were announced similarly. These announcements provide the beginning and end dates that comprise the data on the number of days between attainment of the lower rank and the officer's promotion to the next higher rank.

The sample of officers is drawn from Army records collected at the time of the abolition of the purchase system. When the government announced the buyout of purchased commissions, the affected officers wrote to the Army Purchase Commission to enquire about the value of their asset. There were roughly 7000 men whom the Army Purchase Commission anticipated having to buy out.<sup>9</sup> Our initial sample consists of 1934 individuals drawn from the Infantry regiments numbered 1-99 who were legally permitted to purchase their commission and from the two Royal Rifle corps which enjoyed the same privilege. Of the 1934 officers, 125 were lieutenant colonels in their regiments and another 240 were majors. Captains numbered 851, and 718 were still lieutenants as of November 1, 1871. Non-purchase regiments (numbered 100 and up) were not included, although their officers did engage in a form of buyout of their own. Engineers, Artillery, Supply Train, and medical and veterinary officers were also excluded.

Cavalry officers and officers of the Guards regiments such as the Coldstream Guards, the Grenadier Guards, and the Dragoon Guards, were also excluded from the sample. These regiments are harder to analyze because many of them were exalted by virtue of their long, distinguished histories and populated by persons of great socio-economic status. That meant the over-regulation prices for commissions in these regiments could be extremely high. Personal connections were of paramount importance for admission to their officer

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<sup>9</sup> See Anthony P.C. Bruce, *The Purchase System in the British Army, 1660 – 1871*, London: Royal Historical Society, 1980.

ranks, thus closing them to even very well-to-do young men. We leave the analysis of these elite regiments for future work.

We also culled from the sample those officers who had not risen beyond the rank of ensign at the time of abolition. Many of these officers opted to remain in the Army and make careers under the new rules. Others simply sold their commissions to pursue a civilian career. None of them had paid both regulation and over-regulation prices so no attempt is made to analyze their careers. Finally, we also excluded officers on half-pay whose semi-retirement status was already of long standing, which made it difficult to track their early careers.

The remainder of the data on officers in the sample comes from War Office files related to the abolition of army purchase (W074), supplemented by descriptive data in the Annual Army List of 1872. There are 194 boxes of letters and materials in this set of files. Abolition began on November 1, 1871. Buyouts and retirements were not completed until 1909. Officers wrote to the Army Purchase Commission to make claims for reimbursement based on what they had paid for their commissions. Some buyouts were straightforward as officers were very glad to receive what the Army Purchase Commission offered them. Other buyouts were contentious as officers felt they were being short-changed.

Data on medals, honors, promotions, and postings are available annually in the Annual Army Lists. The War Office also keeps extensive records on each officer and the attributes of his career. Earnings are not reported, but daily rates of pay by rank were adjusted very infrequently and are reported in the Parliamentary records. It is safe to say that no man became wealthy from his Army wages.

Table 1 contains the descriptive statistics for our sample. All of the covariates are time-invariant indicator (dummy) variables. However, it is worth noting that some of these measures tend to be rank-specific; junior officers or younger men were unlikely to possess

many of these attributes. Measures of merit include the award of a Brevet rank, medals for bravery, mentions in dispatches for extraordinary performance, and receiving the Victoria Cross, which was awarded for bravery and extraordinary performance for the first time in the Crimean War. Brevet rank was awarded *ex post* for honorable service, including obedience, organization, initiative, and bravery. Being the adjutant of one's regiment may also have merited a Brevet rank. Brevet is a non-substantive rank bestowed on a worthy officer of at least the rank of captain until a substantive vacancy for him can be found. It is a measure of accumulated merit, and hence was unlikely to be bestowed on a junior officer.

The variables labeled Bought are equal to one if the officer purchased at that rank and zero otherwise.<sup>10</sup> Most officers did not purchase all of their ranks, and many so-called "non-purchase" officers would have bought them if the right opportunity had presented itself. Among our subsample of officers, a considerable number bought at least one rank during their careers; many bought two.

Crimea is a dummy variable equal to one if the officer saw service in the Crimean War and zero otherwise. Crimean War veterans often rose through the ranks quickly because of the widespread losses of officers in the engagements of that war. The war records document numerous cases of serious physical injuries, and many officers were scarred psychologically by their harsh experiences. Many Crimean War veterans received promotions on the battlefields or through the death of a superior officer from a wound or from infection in a military hospital.

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<sup>10</sup> Data on purchase prices are difficult to extract from the letters. The applications for retirement written before 1874 often contain information on the exact over-regulation payment made by the officer. After that, in its efforts to expedite abolition, the military authorities offered gratuities in addition to over-regulation prices or granted various forms of pensions in lieu of a commission's value, so it is often difficult to discern exactly how much late letter writers actually paid. This, too, is a subject for future research.

Home, Asia and Africa are dummy variables that indicate the location of the officer's posting in 1871. Home equals one if the officer's posting was in England, Wales, Ireland or Scotland, and zero otherwise. Asia includes all of India as it then existed, as well as China, Japan, and Southeast Asia. Africa encompasses equatorial postings and what is now South Africa. The omitted category is a posting in either the Americas or in Australia. Posting is included as an explanatory variable because the opportunities to signal may have been greater abroad than at home, although at home the ability to interpret the signals might have been greater. This variable is very noisy, however, since regiments were obviously moved from time to time over the course of an officer's career. Moreover, it is not clear how a posting to Ireland, for example, would have affected the likelihood of promotion. Postings to Africa were thought to be particularly onerous, so that accepting one was, in and of itself, an indicator of meritorious service. The letters from officers headed to a posting in Africa often contained requests to be bought out immediately. Exchanges from one regiment to another were possible until 1922. Officers reported that money often changed hands as one officer acquired a more desirable posting and another officer received a less desirable one.<sup>11</sup> The APC did not reimburse for exchanges, however.

## **V. Empirical Results**

Maximum-likelihood estimates of the parameters of the survival function are presented in Table 2a and Table 2b, below. The first column of each table reports the estimated coefficients of the survival function, with asymptotic standard errors given in parentheses under the estimated coefficients. A negative (positive) coefficient estimate indicates that a change in the value of the covariate from zero to one decreases (increases) the conditional mean length of time in rank, *ceteris paribus*. Starred variables are those

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<sup>11</sup> For more on this, see, for example, "Returns of Officers who have exchanged from one Regiment to another: 1861-1870." House of Commons Parliamentary Papers Online, ProQuest Information and Learning Company, 2005.

whose coefficients have estimated asymptotic t-ratios that allow us to distinguish them from zero at the 95% (\*) or 99% (\*\*) confidence level. The second column reports the hazard (or odds) ratio, which gives the likelihood that an officer with the stipulated characteristic is promoted to the next rank, relative to an officer without that characteristic, other things equal. The odds ratio is related to the survival-function coefficient  $\beta$ , by the transformation  $e^{\beta\sigma}$ , where  $\sigma = 1/P$ . For example, from Table 2a, an officer who was awarded a medal was slightly more than twice as likely to be promoted from lieutenant to captain at any point in time than one who had not received a medal, *ceteris paribus*, since  $\exp(-0.359 \times 2.25) \cong 2.197$ . The results reported at the bottom of Table 2a and Table 2b reveal that the estimates of the scale parameter  $P = 1/\sigma$  are significantly different from one. Thus, we reject the null hypothesis that the exponential distribution characterizes the survival functions in favor of the Weibull distribution. Moreover, since  $P > 1$ , the probability of promotion increases with time in the current rank; i.e., there is positive time (or duration) dependence.

Table 2a reports estimates of a survival model determining the number of days that elapsed between promotion to lieutenant and promotion to captain, along with the odds ratios associated with each estimated coefficient. The screening hypothesis focuses on whether the purchase of any commission other than the first (ensign) affects the time it took to be promoted from lieutenant to captain, other things equal. As the screening interpretation predicts, only the purchase of an ensigncy shortens time in the rank of lieutenant or, alternatively, increases the likelihood of promotion to captain; the estimated effects of the purchase of subsequent commissions (lieutenant and captain) on time spent as a lieutenant are not significantly different from zero. The estimated coefficient on the variable Bought Ensigncy is -0.274. This is related to the odds ratio through the transformation  $\exp(0.274 \times 2.25) \cong 1.83$ . This estimated hazard ratio implies that a young

man who purchased the rank of ensign was approximately 83% more likely to get promoted to lieutenant than one who did not, *ceteris paribus*.

Having an aristocratic lineage reduced time spent in the rank of lieutenant, independent of the purchase of a commission and other included characteristics; indeed, it almost quadrupled the probability of being promoted to captain at any point in time, relative to an officer from a middle-class or lower background. Receiving a Brevet (temporary) commission also reduced time in rank, as did having been awarded a medal. Service in Africa dramatically expedited promotion; interestingly, the effect of such service on time as a lieutenant is roughly equal in magnitude to the effect of coming from the aristocracy.

Table 2b reports the results of estimating a survival model determining the length of time between the promotion to the rank of captain and promotion to the rank of major. Again, the model predicts that, for the prospect of being promoted to major, statistical discrimination is replaced by direct evaluation of merit, so that purchases of earlier commissions should not affect the time spent in this rank. The estimates of the model reveal that none of the first three commission purchases (ensign, lieutenant, or captain) affects the probability of promotion to major. However, the decision by a captain to purchase the rank of major increases the likelihood of promotion by 63% compared to a captain who does not purchase that rank. This result is consistent with a signaling interpretation of that purchase; a promotion ladder existed in which the wage difference between captain and major was not optimal, so that purchasing the next rank hastened the time when a captain could enjoy earning the higher wage.

The results in Table 2b imply that winning a medal does not affect the length of time between promotion to captain and promotion to major, nor does the location of one's posting at the time of the abolition of the purchase of commissions. Once again, being from



the aristocracy and having received a Brevet commission greatly increase the probability of promotion to the next rank; a Brevet commission nearly doubled the likelihood of being promoted, and an aristocratic background tripled it. In addition, having been mentioned in dispatches reduces the time to promotion to the rank of major, while having received a medal does not.

## **VI. Concluding Remarks**

After 1871, the possibility of purchasing the next rank no longer existed. Various reforms, some already in place and others created after the abolition of purchase, reduced the need for a pecuniary signal like purchase and replaced it with opportunities for officers to demonstrate competence in marksmanship, cavalry drill, and infantry maneuvers. Army Camps at Aldershot and Shorncliffe in England and at Curragh in Ireland, as well as the elimination of the ensigncy and the assignment of training to the regimental captain and his subalterns, provided a new institutional setting for both the monitoring and the evaluation of officers and enlisted men. Moreover, after January 1, 1860 no officer was eligible for appointment to the upper ranks of Army administration until he had matriculated in and passed final examinations at the Staff College. All of these reforms effectively replaced the mechanism of a largely decentralized market for commissions with a meritocratic system of professional judgements in the staffing a modern officer corps.

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**Table 1: Descriptive Statistics**

<b>Variable</b>	<b>Mean (Std. Dev.)</b>
<i>Time in Rank</i>	<i>Days</i>
Ensign to Lieutenant	771 (8446.5)
Lieutenant to Captain	2191.6 (1431.3)
Captain to Major	3623.1 (1442.6)
<i>Covariates</i>	<i>Proportions</i>
Aristocrat	0.02
Brevet	0.11
Medals	0.36
Dispatches	0.10
Victoria Cross	0.01
Bought Ensigncy	0.62
Bought Lieutenancy	0.65
Bought Captaincy	0.65
Bought Majority	0.51
Crimean War Service	0.17
Exchanged Once	0.17
Second Exchange	0.035
Home	0.47
Asia	0.36
Africa	0.03
N	1934
<b>Sources:</b> War Office 74, various numbers 1-189, and <i>Hart's Annual Army List</i> , 1872.	

**TABLE 2a:**

**Determinants of Time in Rank and Hazard Ratio:  
Promotion from Lieutenant to Captain**

<b>Variable</b>	<b>Coefficient (std. error)</b>	<b>Hazard Ratio (std. error)</b>
Aristocrat**	-0.595 (0.221)	3.885 (1.180)
Brevet**	-0.677 (0.111)	4.536 (1.176)
Medals**	-0.349 (0.123)	2.197 (1.061)
Mentioned in Dispatches	-0.070 (0.099)	1.118 (1.027)
Victoria Cross	0.213 (0.327)	0.089 (0.267)
Bought Ensigncy**	-0.274 (0.093)	1.828 (0.970)
Bought Lieutenancy	-0.024 (0.090)	1.071 (1.034)
Bought Captaincy	-0.139 (0.089)	1.394 (1.079)
First Exchange	-0.021 (0.096)	1.082 (1.046)
Second Exchange	0.803 (0.455)	0.160 (1.050)
Home	-0.143 (0.126)	1.359 (0.952)
Asia	-0.087 (0.134)	1.195 (0.954)
Africa**	-0.588 (0.255)	3.780 (0.794)
Crimea	-0.919 (0.245)	7.868 (1.016)
Intercept**	10.471 (0.3215)	--
N	125	125
Log Likelihood	-288.10	
Scale ( $\lambda$ ) ** (std. error)	0.444 (0.032)	
Shape (P) ** (std. error)	2.254 (0.161)	

**Dependent Variable:** Elapsed time between promotion to Lieutenant and promotion to Captain (in days)

**TABLE 2b:**

**Determinants of Time in Rank and Hazard Ratio:  
Promotion from Captain to Major**

<b>Variable</b>	<b>Coefficient (std. error)</b>	<b>Hazard Ratio (std. error)</b>
Aristocrat**	-0.519 (0.227)	3.057 (0.709)
Brevet**	-0.241 (0.097)	1.944 (0.977)
Medals	-0.095 (0.120)	1.275 (0.988)
Mentioned in Dispatches**	-0.306 (0.099)	1.768 (1.045)
Victoria Cross	0.461 (0.339)	0.373 (1.218)
Bought Ensigncy	0.062 (0.093)	0.893 (1.070)
Bought Lieutenancy	-0.090 (0.088)	1.175 (1.064)
Bought Captaincy	0.008 (0.087)	1.009 (1.055)
Bought Majority**	-0.201 (0.087)	1.633 (1.011)
First Exchange	-0.165 (0.096)	1.419 (1.081)
Second Exchange	0.806 (0.464)	0.165 (1.035)
At Home, 1871	-0.147 (0.129)	1.381 (1.102)
In Asia, 1871	-0.031 (0.138)	1.123 (1.083)
In Africa, 1871	-0.237 (0.262)	1.686 (0.750)
Crimea	-0.468 (0.248)	0.325 (1.016)
Intercept**	9.246 (0.195)	--
N	125	125
Log Likelihood	-220.186	
Scale ( $\lambda$ ) ** (std. error)	0.448 (0.037)	
Shape (P) ** (std. error)	2.235 (0.158)	

**Dependent Variable:** Elapsed time between promotion to Captain and promotion to Major (in days)