

The Persistence of the Aristocracy: Financial and Social Measures, England and Wales (1858-1907)*

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Abstract

This article examines the persistence of English and Welsh title-holders between 1858-1907. While the historical narrative is that they were unable to weather the shocks of globalisation, industrialisation, and democratisation, I find that this group was highly persistent. This paper makes several methodological contributions, constructing new individual data on the population of wealth-holders (2.2m) and linking this to genealogical data. I construct novel measures of: the level of title-holder wealth, title-holder social mobility, and the hereditary background of title-holders. These show that title-holders were exceptionally persistent in terms of wealth, and that the appearance of decline was primarily a demographic phenomenon. Titled families experienced less downward mobility than comparable wealth elites, and appear to regress towards a higher level than the population mean. Despite persistence in financial terms, the composition of the group changes substantially. This reflects both longstanding strategy (marriages), and shifts during the period (title-grants). Persistence in financial terms arose partly as a result of this phenomenon, with new entrants substantially wealthier than existing title-holders. Together, these results show the surprising persistence of this elite, and help illuminate the role of social capital in the extent and mechanisms behind persistence.

JEL: N33, D31, J62.

Keywords: aristocracy; wealth persistence; elites; social mobility; social capital; big data.

1 Introduction

The fate of the aristocracy is central to our understanding of economic development, inequality and social mobility. It has preoccupied economists from Marx (1867) down to Piketty (2020). In

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preindustrial Britain the aristocracy dominated society. It exercised hegemony over government, land and wealth. Yet, the nineteenth century presented a profound challenge. From the 1880s Britain witnessed the rise of global trade, industry and mass democracy. In the historical literature this is portrayed as *the era of aristocratic decline* (Cannadine, 1990; Rubinstein, 1981; Thompson, 1963; Bush, 1984; Beckett, 1984). The phenomenon was not unique to Britain. In France, the advent of the Third Republic (1870-1945) heralded a dramatic decline in aristocratic fortunes (Piketty et al., 2006). This story is one of decline and fall.¹

Despite this, there is ample evidence of persistence. Aristocrats still feature heavily among the economic and social elite. Students educated at the breeding grounds of the aristocracy, the Clarendon schools, are 94 times as likely to make it elite biographical dictionaries (Reeves et al., 2017). One-thousand years after the Norman Conquest, those with the surnames of Norman landowners are 50% more likely to attend Oxford or Cambridge University (Clark and Cummins, 2014). The aristocracy even retains a surprising amount of direct political power. Almost all recent Prime Ministers have had unelected peers serve as secretaries of state. Rishi Sunak, Boris Johnson, Gordon Brown, Tony Blair and Margaret Thatcher all engaged in this practice.² This hardly seems a ruinous fate.

So what explains these contrasting narratives? The argument for decline is a longstanding one, meticulously assembled from rich, insightful, but fragmented evidence. Without a solid empirical basis, it is difficult to measure how the pieces fit together. This article quantifies aristocratic persistence. It provides a broad perspective, accounting for changes in *absolute* and *relative* terms, for aristocratic *families* and the *institution* as a whole, in *aggregate* and at the *surname* level, and in both *financial* and *social* dimensions.

I construct three main sets of metrics. These concern wealth persistence, social mobility and social composition. First, I measure the wealth of title-holders, both from longstanding families (the *family* measure) and including new recruits (the *institutional* measure). Then I measure social mobility at the ‘extended family’ level. I use the rare surname measure pioneered by Clark and Cummins (2015) to examine differences in mobility patterns between those with titled-surnames, those with common but wealthy surnames, and those from the rest of the population. This method takes inspiration from Collins and Wanamaker’s (2022) work on inter-racial differences in occupational mobility. Finally, I measure changes to the composition of the aristocracy, through their hereditary background, their marriage patterns, and the granting of titles.

These measures use a new dataset, containing detailed information on the population of title-holders, as well as the rest of the population. I collect novel individual level data on the population of wealth-holders (2.2m) by transcribing the Principal Probate Registry (PPR). I then link this with individual data on the population of deaths (26.1m) from Cummins (2021), and genealogical data on the population of title-holders (3.9k) from Lundy’s *The Peerage* database.

I find that the title-holders were highly persistent in terms of wealth. Decline was a demographic, not a wealth-based phenomenon. As an institution, the titled aristocracy were

¹This is the title of Cannadine’s (1990) book on the aristocracy, itself a reference to Gibbon’s work on the fall of the Roman Empire, and Evelyn Waugh’s novel of the same name.

²<https://lordslibrary.parliament.uk/ministers-in-the-house-of-lords/>

propelled up by the entrance of new wealth elites. This highlights the importance of social channels in persistence. Compared to other wealth elites, those with titled surnames were subject to less downward social mobility. This lower mobility regime operated for all titled-surnames, independently of their wealth. Differences in mobility are not explained by differences in the transmission of financial capital. Rather, the explanation lies in other forms of capital embodied by their status: social, cultural or human. There is evidence that the social channel was important. Openness to outsiders was a longstanding feature of the titled aristocracy, but accelerated during this period.

These findings have several implications, empirically and methodologically. They illuminate heterogeneity in elite mobility patterns, that is typically obscured when aggregating across class dimensions. Similarly, the extent of elite persistence depends heavily on how it is defined. If we include new recruits, then persistence is likely to appear stronger. Here, the admission of wealthier newcomers seems to be an important part of persistence. This is both in terms of the institution, with new families granted titles, but also at the family level, through marriages. Yet, in another sense we might think of recruitment as indicative of a lack of persistence. This depends somewhat on the broader context. While recruitment may represent a longstanding strategy or feature of the group, it might also represent the response to a crisis. We also need to be cautious when looking at traditional measures of aristocratic persistence (Piketty et al., 2006; Rubinstein, 1981) which examine changes to the composition of the super-rich. This is certainly an important part of the narrative, but as we shall see, is not synonymous with changes to the average wealth of aristocrats. Different measures produce different narratives, which all inform a broader picture.

The structure of this paper is as follows: The first section provides historical context and definitions. The second section looks at existing literature. The third details the sources used in this study, while the fourth explains the data construction process. The fifth section presents estimates of aristocratic wealth, social mobility, and social composition. The sixth discusses the implications of these results, and the seventh concludes.

2 The Aristocracy

The aristocracy was a longstanding elite. Its wealth had grown significantly in the aftermath of the Industrial Revolution (Lindert, 1986). This wealth was rooted in land ownership, which was increasingly concentrated towards the end of the nineteenth century. Until the 1870s, these estates remained highly profitable (Cannadine, 1990).

The aristocracy consisted of peers, baronets, knights and the gentry. I focus on hereditary title-holders, what we might think of as the ‘nobility’, peers and baronets. This was a (relatively) fixed group, which traditionally exercised institutional, social and economic dominance. The hereditary background of this group is well documented, in sources such as Cokayne’s *The Complete Peerage*, Debrett’s *Peerage and Baronetage*, and Burke’s *Peerage, Baronetage and Landed Gentry*. The peerage had feudal origins, and was broken down into five titles: dukes, marquesses, earls, viscount and barons. The baronetage was a more recent invention. An order of hereditary knights, created by James I in 1611. Both groups were of an equivalent size, with around 600-700 concurrent members towards the end of the nineteenth century. I focus on this,

as the group of individuals whose social status was inherited directly from their forebears.

British title-holders were an unusually prestigious and exclusive group, though they lacked the fiscal privileges enjoyed by some of their continental counterparts. They were far smaller than other nobilities, comprising only 0.01% of the population. In places where the nobility did not enjoy specific legal privileges, this figure tended to around 5-8% (e.g. Spain, Portugal and Hungary), but even where they did (e.g. France, Russia, Austria-Hungary or Sweden) it was typically around 1% (Piketty, 2020). In Britain, peers had substantial political privileges, serving as members of the House of Lords. This was the dominant branch of the British legislature for most of the period. Even the House of Commons was dominated by these families, with around 75% of MPs coming from patrician families as late as the 1860s. The civil service, army, church and judiciary were similarly dominated by the younger sons of aristocrats (Cannadine, 1990, p. 14).

Inheritance of titles and landed estates was established on the basis of primogeniture. However, the agency of heirs over these estates was limited. The estate was typically passed down on the basis of ‘preferential partibility’ (Stone and Fawtier-Stone, 1984). Parts of the estate, usually the newer additions, could be parcelled off and sold, traded, gifted, etc. However, the bulk of the estate, including the ‘seat’, had to be kept together. This was enforced through the practice of entail, which settled the succession of the estate in perpetuity. In Britain, the main mechanism for entail was the strict settlement. An agreement where the heir became a ‘tenant for life’ on property held in a trust. While this system was neither universal, nor absolute, it formed the basis of inheritance practices until the 1880s. After the Settled Land Act of 1882, this system began to break down. The tenant was empowered to sell, lease or mortgage the estate without permission from the trustees. However, this also had limitations. It excluded the principal demesne and sales to the tenant. Proceeds from sales were typically returned to the trustees.

3 Literature

There was an unprecedented transformation of the economic, social and political landscape between 1880 and 1910. The predominant view is that this was *the era of aristocratic decline* (Cannadine, 1990; Thompson, 1963; Bush, 1984; Beckett, 1986; Stone and Fawtier-Stone, 1984). This literature focuses on four major factors: the rise of new elites, the challenges of a globalised economy, the advent of mass democracy, and the introduction of new taxes.

The literature on new elites (Cain and Hopkins, 2016; Rubinstein, 1981; Cassis, 1994) focuses predominantly on changes to the wealth and influence of those from a financial or commercial background. Certainly, there was an increase in the representation of these groups at the top of the wealth distribution. The percent of millionaires from these backgrounds rose from 0-40% between 1830-1905 (Rubinstein, 1981, p. 79-83). There is evidence of a growing social affinity between these bankers and aristocrats (Cassis, 1994), which Cain and Hopkins’s (2016) argue fundamentally altered the balance of political interests.

Aristocrats were being confronted with new economic threats. As international commerce increased, the value of land and grain declined significantly. Land prices and agricultural income fell as much as 50% between 1875-1900 (Jadevicius et al., 2018; Beckett, 1984). The survival

of the aristocracy then, is predicated on their shifting out of these assets. This doesn't match neatly with notions of an unchanging relic of a feudal past.

In the political sphere, the power of the aristocracy was waning. The Third Reform Act (1884) enfranchised the majority of adult men for the first time (Acemoglu and Robinson, 2005). Nonetheless, it was only at the end of the period that the power of the House of Lords was irreversibly altered, with the election of December 1910 effectively seeing their veto power broken (Cannadine, 1990). Even then, the aristocracy still had significant political influence. In the last Conservative government of the period (1902-1905), 46% of the cabinet were peers, and in Liberal government that succeeded it, this was 31% (Wikidata, 2024).

While tax reforms posed a threat to the aristocracy in the longer term, until the end of this period rises were relatively limited. Minimally progressive probate rates had been introduced as early as 1779 (Buxton and Barnes, 1890), but the ratio of rates between the top and bottom band was only 3:1. The first major reform was the introduction of Estate Duty in 1894, which replaced existing rates with a marginally progressive unified tax, ranging from 1-8% of the estate. Previous rates had been around 0.5-3% (Buxton and Barnes, 1890). However, significant progressive reform was only introduced at the end of the period, after significant political struggle. In 1907 the top band increased to 15%, and in 1910 the threshold was reduced from £3m to £1m. In the period between 1902-1907, only 2 estates would have been over this £3m threshold, while 19 would have been over the £1m threshold. Also introduced in 1910 were both a Super-Tax and Land-Tax (O'Hara, 2012). These presented a clear and immediate threat to the aristocracy, and were largely responsible for the crisis that ended the Lords' veto.

Yet, while evidence for decline is rich and detailed, it is assembled from piecemeal evidence: individual accounts, newspaper articles, sales records and biographies. Empirical studies on the decline of the aristocracy are more scarce.

Recent effort to quantify aristocratic decline (Bond and Morton, 2022, 2023) show a different picture. They use peer probates, in combination with aggregate GDP and wealth share data, to measure the trajectory of aristocratic wealth. In absolute terms, peer wealth did not decline until World War II. They argue that this was simply a correlate of the overall decline in top wealth shares. I build on this work, showing that title-holders weren't simply as persistent as other elites, their persistence was exceptionally high.

These works, quantifying the persistence of the English aristocracy, follow several papers which construct similar measures for France (Piketty et al., 2006) and Sweden (Bengtsson et al., 2019). Again, it is important to consider the measure used. Bengtsson et al. (2019) also use sampled probate data. Their main measure concerns all nobles in a given year, what I term a *institutional measure*, as it includes both the old and new entrants to the institution. Bengtsson et al. (2019), who look at wealth average to the rest of the population, argue that the aristocracy was persistent during this period.

For France, Piketty et al. (2006) use a different measure. They measure the proportion of those with aristocratic surnames among top Parisian estates. This constitutes what I term a *family measure*. It tracks a constant set of families over time. This is important, because recruitment may be key to the survival of these elite groups. As a measure of *how many* individuals are above a certain threshold, similar to Rubinstein (1981), this indicator is affected by demographic trends, especially where inheritance is conducted on the basis of primogeniture.

If all of the aristocracy was in the Top 1%, but half died off, concentrating their wealth in the hands of the remaining few, this measure of their ‘representation’ would be halved. Piketty et al. (2006) find a significant decline in aristocratic representation.

These two different measures, of the *institution* versus of specific sets of *families*, and of average wealth versus of representation among the wealth elite, both give important aspects of the narrative, but neither provide the full picture.

Absent from the literature is a robust comparative framework for measuring persistence at the family level. Measuring social mobility allows us to address three concerns with the existing literature. First, we want to know about persistence at the family, rather than aggregate level. Second, even if aristocrats follow the same trajectory as other wealth elites (Bond and Morton, 2023), the changes in the composition of these groups may render them incomparable. For instance, the top 1% may be comprised of entirely different families over the course of 50 years. Finally, we expect those at the top of the wealth distribution to regress towards the mean. We don’t just want to know whether they decline, but how quickly they decline compared to other wealth elites.

There is no existing literature on the social mobility of the aristocracy in Britain. However, the work of Clark and Cummins (2014, 2015) suggests that elites in general experienced limited mobility. Recently, a number of works have shown heterogeneity in social mobility along ethnic or social dimensions (Cummins and Ó Gráda, 2022; Collins and Wanamaker, 2022). In particular, Collins and Wanamaker (2022) argue that Black Americans experienced a cap to their upward-mobility, when compared to similarly positioned Whites. Here, I examine the opposite effect. A floor to the downward mobility of the social elite, when compared to other wealth elites. I show that the class dimension is important here, and that aggregate measures of social mobility may mask heterogeneity in outcomes.

4 Sources

I use four sources to construct a linked dataset, containing the population of wealth-holders, deaths, and for title-holders detailed genealogical data. These are: the Principal Probate Registry (PPR) calendars, which is used for information on wealth-holding; Lundy’s *The Peerage*, which contains genealogical information on title-holders; and two sources of mortality data, the Annual Reports of the Registrar General’s Office, used for descriptive statistics; and individual level Death Registers, used for social mobility estimates.

4.1 PPR

I estimate wealth at death using a complete transcription of the Principal Probate Registry calendars, 1858-1907. These records contain information on wealth at death, date of death and aristocratic title. I collect information from 258,701 scanned images. These contain information for the population of wealth-holders in England and Wales dying with wealth over the probate threshold. In total, I collect 2.2m probate records. I report all wealth in 1907£, adjusted using the ONS historical CPI index (Allan et al., 2004).

These probate records are the most commonly used source on historical wealth-holding (Lindert, 1986; Rubinstein, 1981; Wedgwood, 1928; Harbury, 1962; Perkin, 1978; Nicholas,

1999; Rothery, 2007; Clark and Cummins, 2015; Cummins, 2021). However, with the exception of Cummins (2021) and Clark and Cummins (2015) these rely on small hand-collected samples. Collecting them *en masse* allows me to disaggregate the data by genealogical background, and to estimate social mobility.

The advantages and disadvantages of English and Welsh probate records has been extensively discussed. In particular, the issues of wealth at death versus living wealth, *inter vivo* gifts, the asset classes included, etc. (Bond and Morton, 2022; Daunton, 1989; Rubinstein, 1991; Morgan and Moss, 1986; Lindert, 1986; English, 1984). I will briefly discuss the most significant.³

Alvaredo et al. (2018) adjust for life-cycle effects using mortality multipliers for their nineteenth and twentieth century wealth inequality estimates, but find that these adjustments have no significant impact. Cummins (2021), Bond and Morton (2022) and Bond and Morton (2023) make no such adjustment. These effects only matter insofar as relative mortality changed across this period, among those who were eligible for probate, or might have been under a different mortality regime (I discuss this further in Section 7.2.5).

Inter vivo gifts or tax evasion be a concern for probate data. However, low rates of inheritance tax (see Section 3) meant that this appears to have been limited in the period before 1910 (Daunton, 2002; Bond and Morton, 2022). Indeed, until 1910 *inter vivo* gifts were only taxed within 1 year of death (Rubinstein, 1981, p. 3). This was changed to 3 years in 1910 (Atkinson, 2018), and became a significant concern from the 1920s onwards (Cummins, 2021).

The probate valuations report the *gross* rather than *net* value of the estate. Nonetheless, the proportion of the estate that comprised of these liabilities was stable across the wealth distribution. Green and Owens (2013) look at the distribution of assets and liabilities in full probate inventories, for different bands between <£1000 to £100,000. They find that liabilities were between 10.9% to 15.1% of the gross value across all wealth bands (Appendix A.2).

The most pressing concern is that before 1898 probates only include unsettled personality. This is the personal (non-real estate) property of the testator which is not held in settlement (e.g. trusts). From 1898, unsettled realty is included, but again only as part of an aggregate figure. This issue confronts every work contending with the period. In my results, and those of Bond and Morton (2022) and of Cummins (2021) there are no clear discontinuities in wealth in 1898 (see Appendix A.1). Realty at the top of the wealth distribution was usually settled (Stone and Fawtier-Stone, 1984). While a part of the estate was missing, the lack of discontinuity indicates this component was relatively constant. It was mostly settled wealth, which continued to be excluded. Even when restrictions on entailment were lifted, the proceeds generated from sales would usually go into settled personality (Stone and Fawtier-Stone, 1984). Even so, there were very few recorded sales of these estates in the period before 1910 (Cannadine, 1990, p. 110).

There are no clear breaks in the the distribution of wealth in 1926, when settled land and realty were first included (Cummins, 2021; Alvaredo et al., 2018). Green and Owens (2013) show that the composition of estates was relatively constant across the wealth distribution. While personal, ‘movable’ wealth is not be a perfect proxy for overall wealth, the two are closely related.

³Minor issues include: 1) probates were also given as banded valuations until 1881, I simply take the midpoint. These bands are narrow, there are 79 bands in total, each comprising an average of 1.3% of probates; 2) it was not mandatory to have a probate granted below a minimum threshold, this is addressed in the next section.

4.2 Death Records

I use two sources concerning mortality to estimate the size of the non-probated population. I use reports from The Annual Reports of the Registrar General for aggregate results, and individual death registers for social mobility estimates.

The *Annual Reports of the Registrar General* give summary statistics on births, marriages and deaths from 1837 onward. I digitise the annual mortality by age series, for England and Wales. This is grouped into multiple age brackets. I group all adults (those aged 20+), and use mortality information on them to estimate the eligible non-probated population (by excluding non-adults). There are 26m deaths for the period 1858-1907, of which 14m are of adults.

The individual death registers are from Cummins (2021). This gives individual-level records of each death registered in England and Wales. Unfortunately, it does not report age at death before 1866. This means I estimate the adult proportion of this data for these years. I therefore use the aggregate reports where possible, namely, the aggregate results.

4.3 Lundy's *The Peerage*

I include genealogical information on title-holders from Darryl Lundy's *The Peerage*. This is a genealogical database of British title-holders and their extended families. It uses a variety of sources: the *Royal92.ged* database, SN's *Royalty* database, Cokayne's *The Complete Peerage*, and Burke's *Peerage and Baronetage*, among others. It contains information on 3.9k title-holders living between 1858-1907, of which 1.4k die. The coverage of the database is very good in this period. (Cannadine, 1990, p. 11) estimates that there were 573 British peers in 1880, Lundy's database contains 566, 98.8% of the total.

5 Data Construction

The data construction process consists of two stages. Constructing the Principal Probate Registry database, and linking it with the sources on genealogies and deaths. This section contains a summary of the construction process, more details are given in Appendix B.

5.1 Data Collection

I scrape the population of probate calendars for 1858-1907. This is 258k images in total. I transcribe this using custom image segmentation algorithms implemented in *OpenCV* and using *tesseract*. I parse the text using regular expressions to extract the following variables: surname, forenames, wealth, title, date of death. I apply some checks to data quality. I manually check all probates with a value of over £1m. I manually check the classification of all title-holders identified in the probate data. I automatically remove all Irish and Scottish probate calendars using regular expressions.⁴

⁴These were sometimes sealed in London, but the full details of the probate are not reported.

5.2 Linking

I hand match all entries labelled as title-holders in Lundy's *The Peerage*. There are 1,764 title-holders in *The Peerage* who die in the period 1858-1907. Both sources contain a variety of identifying variables: full name, exact date of death, an individual's title-rank, their specific title, their exact address, the executors of the estate, or family members (for an example see Appendix B.4).⁵ It seems unlikely that there are any false matches created by this process.

Table 1: Match Statistics, by Title Rank

Title	Count	Matched (%)
Duke	48	85.4
Marquess	44	75.0
Earl	271	88.2
Viscount	87	87.4
Baron	349	88.0
Lord	53	83.0
Baronet	912	79.4
Total	1764	83.0

Note: Based on Lundy's *The Peerage* and PPR Calendars. 'Lord' is only used where a more specific title, i.e. Duke-Baron, is not given.

I match 83.0% of entries from *The Peerage* with the probate calendars, giving 1,464 unique matches. This is similar to the match rate obtained for peers by Bond and Morton (2022) for 1858-2018, where they match 77.4% of hereditary peers. See Table 1 for the match statistics (for an explanation of why some individuals might not be matched see Appendix D.2).

5.3 Estimation

To combine these sources into an individual-level database containing the entire population of adults, it is necessary to estimate several variables: the number of non-probated deaths, the wealth of those dying without probate, and the age of each title.

5.3.1 Deaths

The number of non-probated individual in each year is simply the number of adult deaths, minus the number of probates that list that death year. We can calculate this at the surname-level with the number of deaths, and the number of probated deaths by surname.

Unfortunately, the individual death registers do not list age at death for the first 7 years of this period (1858-1865). Using the Death Registers in combinations with the Annual Reports of the Registrar General, which do contain age at death for the whole period, it is possible to accurately estimate non-probated deaths at the surname-level (the estimation procedure and evaluation are in Appendix D.1). This accounts for variation in child:adult mortality over time, and differences in child:adult mortality by surname. It does not account for shifts in differences in child:adult mortality regimes between surnames during these 7 years, which are likely to be limited.

⁵Title-holders often held multiple titles. *The Peerage* contains a full list of titles, whereas the PPR typically only records the primary title.

5.3.2 Non-Probated Wealth

To calculate the wealth of non-probated decedents, I employ the standard HMRC procedure (Cummins, 2021; Turner, 2010). By this estimate 99% of aggregate wealth is captured within the probates, even though they comprise less than 20% of the population. I then estimate upper and lower bounds for non-probated wealth. The upper bound is that each non-probated individual had the maximum allowed below the mandatory reporting threshold. The lower bound is that they had nothing. Estimates for these bounds are presented in Section 7.1 and in Appendix E.4 for Section 7.2.

I follow Bond and Morton (2022) in assuming that all title-holders were probated. Title-holders could be missing because: they do not have enough wealth, their estate is hidden from tax authorities, or it is held in different jurisdictions. By assuming title-holders were all probated, I may slightly overestimate their level of wealth. However, assuming that all non-matched title-holders should appear in the non-probated population, with £0 wealth would heavily underestimate it. There appear to have been very few title-holders around this cutoff (see Appendix D.2), and as tax evasion was relatively limited, the most likely explanation seems to be that their property was eligible in different jurisdictions, such as Scotland, Ireland or overseas.

5.3.3 Dating Titles

There are various methods of classifying the age of a title-holder's lineage. Either through genealogical or heraldic means. The genealogical method is to search back through the patrilineal line to find the oldest, unbroken title-holder. The heraldic method is to search through the list of titles each individual had, and find the date each was created, and the oldest among them. I employ the second method, which accounts for horizontal transmission of titles within families.

6 Methodology

Before embarking on a study of aristocratic persistence we must first answer two questions. What is persistence and who were the titled aristocracy? There are a number of ways each can be defined and, as we shall see, these different definitions provide different perspectives.

Absolute and Relative — We can define wealth persistence in either absolute or relative terms. This was a period of rapid economic growth. Aggregate wealth at death quadrupled during this period. It is hardly surprising then that the aristocracy did not decline in absolute terms. I do go into these findings, which mirror the work of (Bond and Morton, 2022) on peer probates, in much detail. Relative measures, on the other hand, tell us about changes to the position of the aristocracy within society. This is the focus of Section 7.1.

Presence and Averages — Studies of wealth elites have used two main approaches. The most common is to study the composition of top wealth percentiles, e.g. the top 1% that come from a particular background. This is an approach employed by Piketty (2020); Alfani (2024); Rubinstein (1981). This measures the persistence in the *presence* of a group among the wealth elite. As well as tracking average status, it also tracks demographic trends. It is frequently used when we don't have information about the whole wealth distribution. We can also measure average wealth relative to the mean, the approach employed by Bengtsson et al. (2019). This tells us about persistence in terms of average wealth, but not in terms of the number of wealthy individuals from this background. Both measures are useful for different reasons. The former tracks might represent the overall influence of a group, while the latter tracks the average status of an individual from that group.

Family and Institutional Measures — There are various ways to define a group or class. We could think about the persistence of a constant set of families who originally comprised the group. I term this the *family* measure. We could also measure the persistence of the group as a whole, including new recruits. This I term the *institutional* measure. Again, both measures inform the overall narrative. We want to know how successful those original families were, but also how recruitment strategies affected the persistence of the group as a whole.

Social Mobility – Not only is the level of wealth relative, so is the movement of families. All families at the top of the wealth distribution should regress downwards, towards the mean, over time. We can measure varying degrees of persistence at the family level. A social group could be considered ‘persistent’ if constituent families regress more slowly towards the mean than other groups. In particular, we can benchmark members of a particular group against others who begin at the same place in the wealth distribution. This gives us an idea of what mobility might look like for the offspring of title-holders, were they not titled.

Financial and Social Capital — Many of these mechanisms for persistence in terms of wealth rely on adaptiveness in social terms. To consider the effect of a shock, we need to look at both. While a group might be persistent in terms of wealth, this could be the result of substantial changes to the composition over time. Broadly speaking, a group might exchange social capital in return for greater persistence in financial terms.

7 Results

This section splits the results into three key aspects: firstly, persistence in terms of aggregate wealth; secondly, persistence in terms of wealth at the family level, that is social mobility; finally, persistence in terms of the composition of the group. Wealth was exceptionally persistent, both in aggregate and in terms of social mobility. It was bolstered significantly by the recruitment of wealthier newcomers. This was not an entirely new phenomenon. The titled-aristocracy was recruiting a large number of outsiders, even at the beginning of the period. Nonetheless, that process accelerated over these fifty years.

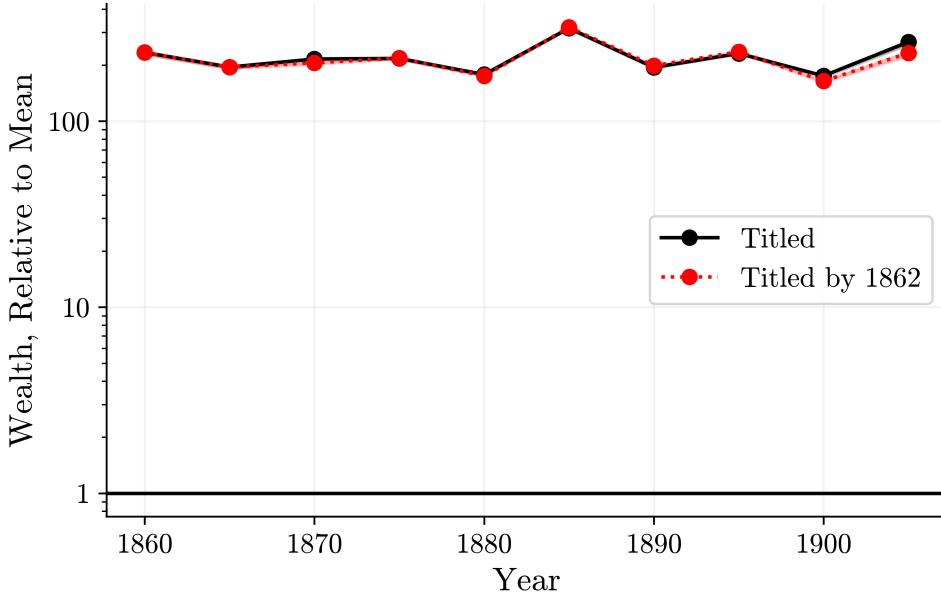
7.1 Wealth

7.1.1 Average Status

Figure 1 shows the mean wealth of title-holders relative to the rest of the population. The red line corresponds to the *family* measure, title-holders who held titles that existed before 1862. The black line is the *institutional* measure, including all title-holders. The most striking finding is that the title-holding aristocracy was highly persistent in relative terms. Their wealth is constant across the period, with only a slight dip between 1890-1900 in the *family* measure. In the first 5 years, title-holders from existing families had wealth at 234x the population mean, in the last 5 years this was 232x. In absolute terms an even larger gap opened up. The average wealth left at death for the whole population roughly doubled during this period, from £302 to £770. For title-holders from pre-existing families it increased from £70,713 to £179,183. If we include new entrants, the average rose to £205,258.

The long-tailed distribution of title-holder wealth means that the death of particularly wealthy individuals induces noticeable peaks and troughs. Within title-holders there is substantial spread of wealth. Yet, the number of ‘poor’ title-holders is small. Only 5% are below the population mean, itself skewed by the long-tailed distribution of population wealth, and none are below the population median. Still, the range of title-holder wealth is impressive, ranging from 5400x the mean to just 0.01x. Nonetheless, the trends in wealth don’t vary substantially across the aristocracy. If we split the data

Figure 1: Mean Wealth of Title-Holder, Relative to Population



Note: Based on 2.2m PPR records, of which 1.4k concern title-holders, records of 13.9m deaths from Reports of the Registrar General, 1858-1907, and genealogical information from Lundy, ‘The Peerage’. Non-probated wealth estimated using HMRC procedure, see Cummins (2021); Turner (2010). The red line shows those whose titles existed in 1862 or before. Shaded region is minimum/maximum values possible with different procedures. Plotted as 5-year averages relative to population mean, with a logged y-axis.

into peers and baronets, both are equally stable across the period, though peers were 44% wealthier on average.

The wealthiest title-holder, in relative terms, was Sir Andrew Barclay Walker, 1st Baronet, a brewing magnate who died in 1893 with £3.1m in 1907£. This is just shy of the wealthiest recorded title-holder, Lord Wentworth Blackett Beaumont, 1st Baron Allendale, an industrialist raised into the nobility in 1906, who died in 1907 with £3.2m. This was an extreme level of wealth. For reference, the richest titled Rothschild who died during this period was Sir Anthony Nathan Rothschild, 1st Baronet, who died with £1.7m, and the wealthiest Rothschild without a British title, Lionel Nathan de Rothschild, died with £2.7m.⁶ In contrast, the poorest title-holder, both in relative and absolute terms, was Sir Edward Blount, 8th Baronet Sodington, who died with a personal wealth of just £5. His family had been ennobled in the early 17th century, but suffered greatly during the English Civil War, with their country house burnt to the ground, their estates confiscated, and the progenitor of the family imprisoned (Cokayne, 1902, p. 202). Overall, the top 1% of title-holders held 16.7% of its wealth, and the top 10% held 59.6%. Peers were substantially wealthier, by 40% on average. We’ll return to the relative persistence of these different families in the section on social mobility.

If we look at the presence of ‘extremely rich’ (more than 1000x mean), or ‘relatively poor’ (less than mean) title-holders, which correspond to roughly the top and bottom 5%, then we can see that the minor fluctuations in average wealth are more closely related to an absence of extremely wealthy title-holders,

⁶All in 1907£.

rather than fluctuations in the number of relatively poor ones. The correlation between the number of ‘extremely wealthy’ title-holders, and the mean wealth relative to the population is 0.88, whereas the correlation with the number of ‘relatively poor’ is -0.18. Year-on-year variation in mean title-holder wealth was mostly the result of the occasional deaths of the extremely wealthy.

New entrants bolstered the wealth of the titled aristocracy significantly. If we include new families in the measure of wealth (the *institutional* measure) then the average wealth of title-holders is 15% higher than if we only include pre-existing families (the *family* measure). The relative contributions of new and old title-holders is made clearer if we look at mean wealth at death for title-holders with 0 to 1 titled predecessors, versus those with two or more. Throughout the period, new title-holders are much wealthier. This rises from about 2x as wealthy at the beginning of the period to 3x by the end. There is an interesting dynamic here. As the number of non title-holding wealth elites increased relative to title-holders, the pool of eligible candidates increased, driving up demand and increasing the price of entry. As the surrounding wealth elite expands, the gains from recruitment increase.

7.1.2 Presence

Yet, taken from another perspective the titled aristocracy seem to be in decline. This is the view we might get from Rich Lists, or from their representation among top wealth percentiles. I present results on this in Figure 2. The data is noisy. There are only an average of 278 individuals dying in the top 0.1% per year, and only an average of 10 of these are title-holders (for context there are 29 title-holder deaths per year). The graph shows the percent of the top 0.1% of wealth-holders who were title-holders. It is immediately evident that while the average wealth of title-holders remained constant, their representation among the wealth elite declined. This share dropped by approximately 25% between the period before 1875 and the period after. This decreases in ‘presence’ might account for the accounts of decline given by Rubinstein (1981), and more descriptive historical work.

However, it is important to note that this is driven by demographic phenomenon, namely a long-run decline in the share of title-holders in the population. Their share of total deaths is 18.2% lower from 1875-1907 than it is in 1858-1874. While there is a sharp rise in the number of non-titled deaths, 23.2% higher after 1875, primogeniture ensured that the number of titled deaths were virtually constant. This was partly reversed by the admission of new recruits. If we include these, then the demographic decline of the aristocracy becomes more muted, especially after 1890. While these estimates show the declining presence of title-holders in society, they tell us little about average status.

7.2 Social Mobility

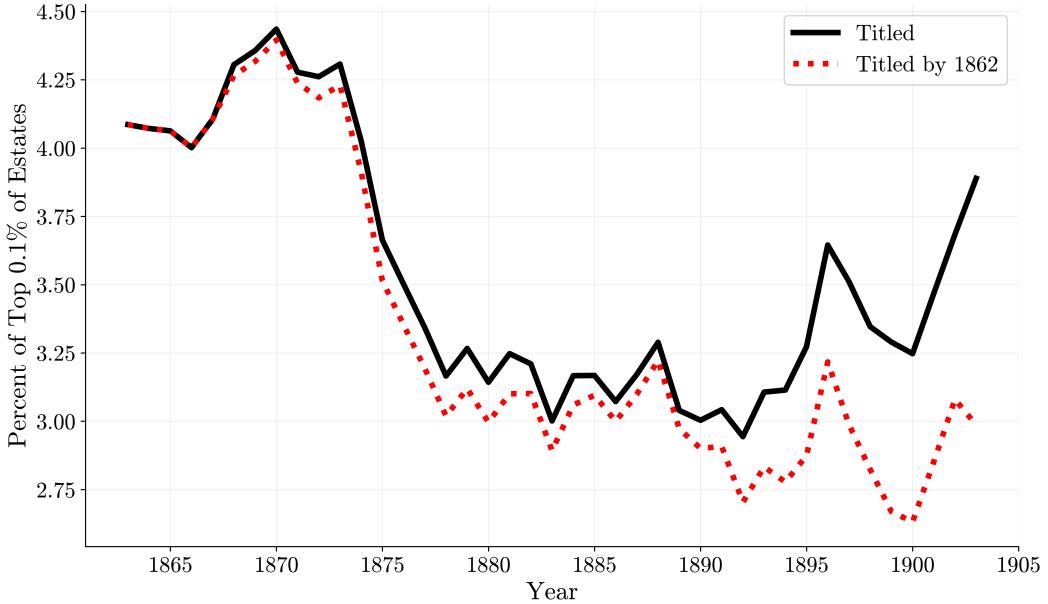
This section estimates rates of social mobility for title-holders, and compares them to those of the rest the population and of other wealth elites. The previous results establish that the wealth of title-holders did not decline, on average. This section looks at movement in terms of wealth, at the extended family level. It uses the rare surname method, pioneered by works such as Clark and Cummins (2015), to provide a direct benchmark for persistence, comparing the movement of extended families from different social groups. We expect title-holders to regress to the mean over time. The issue is whether they move down more quickly or slowly than other wealth elites.

7.2.1 Rare Surnames

Rather than measure parent-child mobility directly, I compare generations of individuals from the same extended family. To do this I construct a sample of individuals with rare surnames. There are two motivations for doing so, one practical and one theoretical.

The practical reason is so that we can compare the movement of families where we don’t have linked genealogical data. This data only exists for title-holders and their families, so we would have no one to

Figure 2: Titled Representation in Top 0.1%



Note: Based on 2.2m PPR records, of which 1.4k concern title-holders, records of 13.9m deaths from Reports of the Registrar General, 1858-1907, and genealogical information from Lundy, ‘The Peerage’. Non-probated wealth estimated using HMRC procedure, see Cummins (2021); Turner (2010). Gives percent of top 0.1% of estates in the population which belonged to title-holders. The red line shows those whose titles existed in 1862 or before. Shaded region is minimum/maximum values possible with different procedures. Plotted as 10-year rolling average.

compare their mobility patterns against.

The theoretical reason for using rare surnames is because this helps us to measure underlying status. Preferences and trade-offs between different aspects of status mean that any single measure is a noisy indicator of status. We can think of this as

$$w_{it} = x_{it} + u_{it} \quad (1)$$

where w_{it} is an individual i 's wealth at time t , x_{it} is their underlying status, and u_{it} is some random component linking the two together. The noisiness of this estimator will lead to attenuation bias, because the random component downwardly biases the parent-child correlation.

This can be addressed using family or extended family averages. An extended family shares the same underlying status, and these random components should average out. Rare surnames can be used to identify these extended families. There are critiques of this method, notably Torche and Corvalan (2018). However, the central criticism is that rare surname estimates capture between-group mobility, rather than overall mobility. They don't capture movement within the surname group. In my setting, between-group mobility, that is the trajectory of the extended family or dynasty, is exactly what we want to capture.

I define rare surname groups using the same rarity thresholds as Clark and Cummins (2014), adjusted for the length of the period. For double-barrelled surnames I take the first part of the surname only.⁷ A threshold that is too high may result in limited information about status being captured by the surname,

⁷This is because otherwise we might bias the sample against certain families of title-holder, who often have unique double or triple barrelled surnames.

whereas lower thresholds risk more unrepresentative data. I present robustness checks re-running the regressions with different rarity thresholds in Appendix E.2. The baseline estimates define rare surnames as those with between 3-250 deaths between 1858-1907. I estimate intergenerational wealth elasticity for two generations, 1858-1882 and 1883-1907.

Due to the highly skewed distribution of wealth, I use the natural logarithm of wealth (in 1907£), at the surname level, normalised by the average in each generation. I define this measure M_{st} as follows. I first define the average log wealth A_{st} at the surname-period level,

$$A_{st} = \frac{1}{N_{st}} \sum_{i=1}^{N_{st}} \ln(w_{ist}), \quad (2)$$

where N_{st} is the number of individuals in surname s at time t , and w_{ist} is the wealth of individual i in surname group s at time t . Then I define M_{st} as:

$$M_{st} = A_{st} - A_t, \quad (3)$$

where A_t is the average of A_{st} across all rare surnames, at time t . There are 67,777 rare surnames which have at least one decedent in each generation. These rare surnames follow the same wealth distribution as the population of surnames (see Appendix E.1).

7.2.2 Group Specific Mobility

I use these measures of rare-surname wealth to measure the social mobility patterns of three groups: titled surnames, matched wealth elite surnames, and the rest of the population. I define titled-surnames as any surname with a decedent who was titled by 1882 (Generation 1). I then estimate the regression:

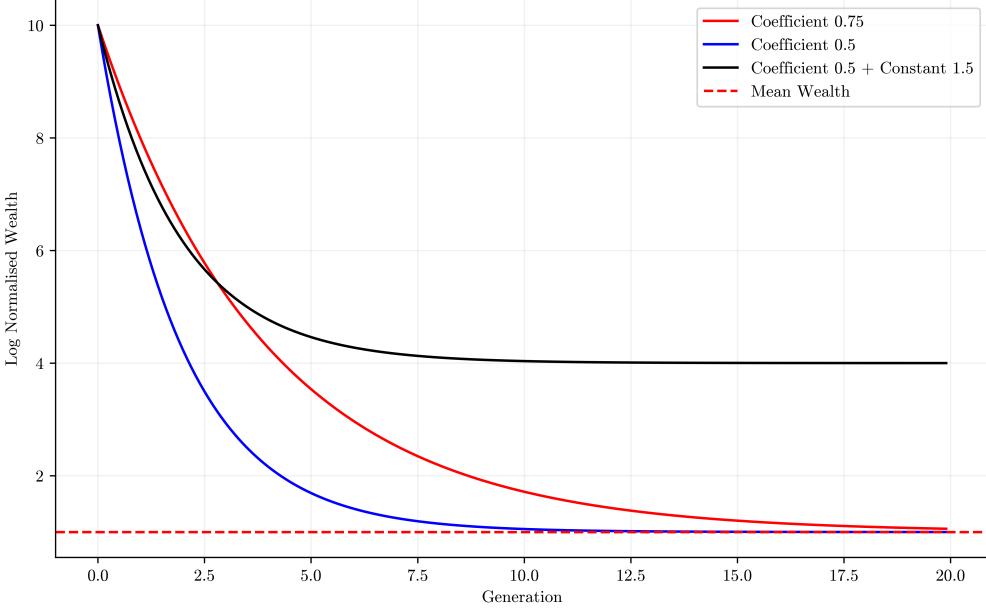
$$M_{st+1} = \alpha + \beta_1 M_{st} + \beta_2 M_{st} \times Group_{st} + \beta_3 Group_{st} + \epsilon \quad (4)$$

The intercept α is zero by definition, the term $\beta_1 M_{st}$ gives the underlying intergenerational wealth elasticity for the population. For each group (titled or matched) I add a constant term and an interaction term. This follows the approach in (Collins and Wanamaker, 2022, p. 105). The interaction term $\beta_2 M_{st} \times Group_{st}$ gives the additional intergenerational wealth elasticity for members of the group. The constant term $\beta_3 Group_{st}$ gives the difference in wealth in Generation 2 for members of the group.

The coefficients on the constant and the interaction terms represent two different mobility regimes. These are represented in Figure 3. The blue line shows the baseline regression to the mean for the underlying population, with a intergenerational wealth elasticity of 0.5 and a constant of 0. If the interaction term β_2 is positive, this means a slower regression to the population mean. For instance, if it is 0.25 for members of the group, then the overall intergenerational wealth elasticity for these surnames would be 0.75. This is shown in red. Here, the size of the group membership effect is dependent on the wealth of the previous generation. It operates through wealth transmission. If the constant term β_3 is positive, then the next generation members of that group experience a flat wealth bonus. In this case group members regress towards a higher mean than that of the population. This is shown in black. Here, group members have the same intergenerational wealth elasticity as the population, 0.5, but experience a flat wealth bonus of 1.5 log-normalised wealth in the next generation. In this world, being in the group has an effect on the wealth of the next generation, independent of the wealth of the previous generation.

While a higher intergenerational wealth elasticity indicates differences in how wealth is transmitted, regression towards a higher mean indicates an effect external to the wealth of members of the previous generation. We might think of the former as a more financial class of explanation, while the latter relies on non-financial explanations, for instance social, cultural or human capital. Of course, a mixture of these explanations is possible.

Figure 3: Social Mobility Regimes



Note: This figure plots expected regression to the mean under different social mobility regimes. The blue-line shows a baseline intergenerational wealth elasticity coefficient, with no constant bonus. The red-line shows a different elasticity. The black line shows the same elasticity, with a constant added.

7.2.3 Matched Group

We also want to know the extent to which these patterns are unique to titled families. While these patterns could be specific to title-holders, they might simply result from the position of these families in the wealth distribution. For comparison, I create a matched wealth elite group. This allows me to examine what wealth in Generation 2 looks like, for families starting at the same position as titled families, but without the title. This counterfactual operates similarly to Collins and Wanamaker (2022), but instead of looking at black sons as if they had white fathers, we are looking at what titled children would have if they had non-titled parents. I achieve this by sampling rare-surnames from the wealth distribution as close as possible to titled surnames. As the population of surnames is much larger than that of titled surnames, this produces an identical distribution (Appendix E.3).

7.2.4 Regression Results

Table 2 presents the results. These are descriptive regressions showing social mobility in terms of intergenerational wealth elasticity and log-normalised wealth bonuses. The results show that those with titled surnames experienced less mobility than either matched wealth elites, or the rest of the population. Their distinctive regime is characterised not by a higher intergenerational wealth elasticity, but by a constant wealth bonus. Those with titled surnames regressed at the same rate, but towards a higher mean than that of the population. While equally wealthy non-titled surnames do not exhibit a trajectory that is significantly different from the rest of the population.

Column (1) presents the intercept (intergenerational wealth elasticity bonus) and slope (constant bonus) estimates for titled-surnames, Column (2) adds controls for: the number of individuals in each rare-surname group, a linear and squared term for the average year decedents in Generation 1 died, and the average distance in years between Generation 1 and 2. Columns (3) and (4) present the same estimates, but for the matched wealth elite group instead. In both specifications including terms for

Table 2: Rare Surname Intergenerational Wealth Transmission Regressions

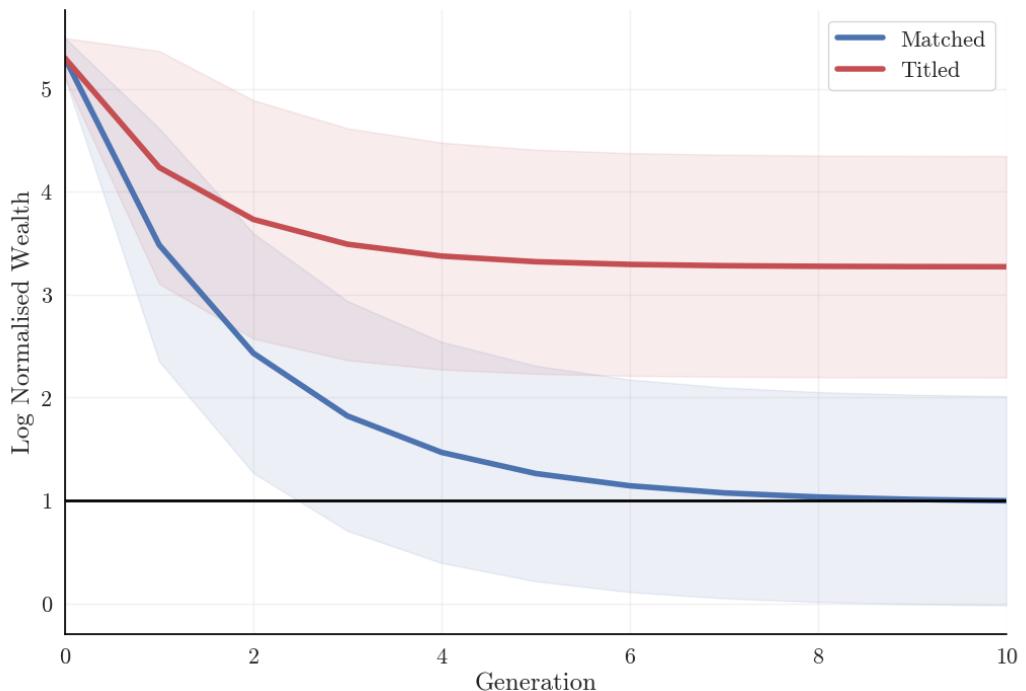
	(1) Titled	(2) Titled	(3) Matched	(4) Matched
Intercept	-0.01 (0.01)	330.07 (1047.20)	0.00 (0.01)	373.56 (1048.88)
Parent Wealth	0.54*** (0.00)	0.50*** (0.00)	0.54*** (0.00)	0.51*** (0.00)
Parent Wealth \times Group	-0.14 (0.07)	-0.02 (0.07)	0.00 (0.08)	0.07 (0.07)
Group	2.48*** (0.39)	1.73*** (0.38)	-0.17 (0.39)	-0.32 (0.38)
Controls	NO	YES	NO	YES
R^2	0.33	0.36	0.33	0.36
F-Stat	1.1×10^4	6.3×10^3	1.1×10^4	5.4×10^3
RMSE	1.89	1.85	1.89	1.89
Observations	67777	67777	67777	67777

Notes: Intergenerational wealth elasticity measured using same method as Clark and Cummins (2015). I use log wealth, normalised to the mean, averaged at the surname-level, for rare surnames (3-250 deaths, 1858-1907). Titled-surnames are those with a titled decedent in Generation 1. There are 644 titled rare surnames. Matched group produced by sampling closest non-titled surname-group in wealth distribution (without replacement) in Generation 1. Controls are for: the number of individuals in each rare-surname group; the average year decedents in Generation 1 died, as linear and squared terms; the difference in years between average Generation 1 and Generation 2 deaths. ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$

titled-surnames, the coefficients on the constant effect are significant, while the coefficients on the wealth elasticity bonus are not. None of the coefficients for those with surnames from the matched group are significant. This indicates that a lower mobility regime was a distinctive attribute of those with titled-surnames, but one that did not scale with their wealth. The lack of interaction with the wealth term suggests a non-financial mechanism, perhaps social, human or cultural capital.

Using these coefficients and their associated standard errors, we can project the expected regression to the mean for future generations, starting at the average wealth of someone with a titled or matched surname (Figure 4). Despite the marginally higher intergenerational wealth elasticity of those with matched surnames, the constant bonus applied to titled surnames means that even in generation 2 they are wealthier. Regression to the mean takes longer for those with matched surnames, around 10 generations, perhaps indicating higher *transmission* of wealth. However, they regress towards the population mean. Titled surnames converge in just 6 generations, but to a substantially higher level of wealth. The combination of intergenerational wealth elasticity, and this bonus mean that they converge to a level around 26x the mean.

Figure 4: Expected Regression to the Mean, Title-holders and Wealth Elites



Note: Projected from regression columns (1) and (3). This figure is intended to provide intuitive insights into mobility dynamics, not precise estimates. It begins using average log-normal wealth in Generation 1, and the associated standard error. It calculates the next generations wealth as $M_t = M_{t-1} \times (\beta_1 + \beta_2) + \beta_3$, and the standard error as a linear combination of the variance associated with the baseline and interaction elasticity coefficients, the constant term, and wealth's starting variance (for details see Appendix E.5). The shaded region represents a 95% confident interval.

7.2.5 Robustness

To ensure that differences are not the result of the estimation procedure, we need to address several concerns over robustness. These are: measurement error, life-cycle bias and selection bias.

Measurement Error—A single observation of wealth is a noisy measure of family status, which might lead to attenuation bias. The surname-measure helps address this issue (see above and Clark and Cummins (2015)). While there is still debate about whether this is an appropriate measure of individual-level social mobility ((Torche and Corvalan, 2018)), here we are attempting to measure the movement of the surname group. To check for sensitivity to measurement error, I conduct robustness tests rerunning the regressions with classical standard error added. I follow Collins and Wanamaker (2022), adding measurement error in terms of $\ln(\text{wealth})$ to individuals in Generation 1 and 2. The standard deviation of the measurement error is the ratio of the standard error of $\ln(\text{wealth})$ to the mean. This coefficient on the titled constant goes from 1.73 to 3.2 and on the interaction from -0.02 to -0.01.

Life-cycle Bias—Systematic differences in age at death could impact reported wealth. Here, the expected difference in adult mortality between these groups is small. By 1850, the aristocracy exhibited a very similar adult life expectancy to the rest of the population (Hollingsworth, 1977). The Registrar General’s Office, decennial report (1871), show that while the proportion of adult (20 plus) gentry and aristocratic deaths that was above age 55 was relatively high, around 77%. This was not dissimilar to elite occupations, like magistrate, clergyman, or banker, all of which had similar or higher proportions dying above 55, at 94%, 90%, and 74% respectively.

Rare Surname Selection—Rare surnames might not be representative of the population as a whole. I show in Appendix E.1 that rare surnames follow a similar distribution of wealth to the population of surnames. I re-estimate the above regressions using different thresholds for rarity in Appendix E.2. The estimates are not sensitive to different thresholds for surname rarity.

7.3 Social Composition

I now look at persistence in terms of social composition. While those from a titled background were highly persistent in terms of wealth, this was in part due to the recruitment of outsiders (see Section 7.1.1).

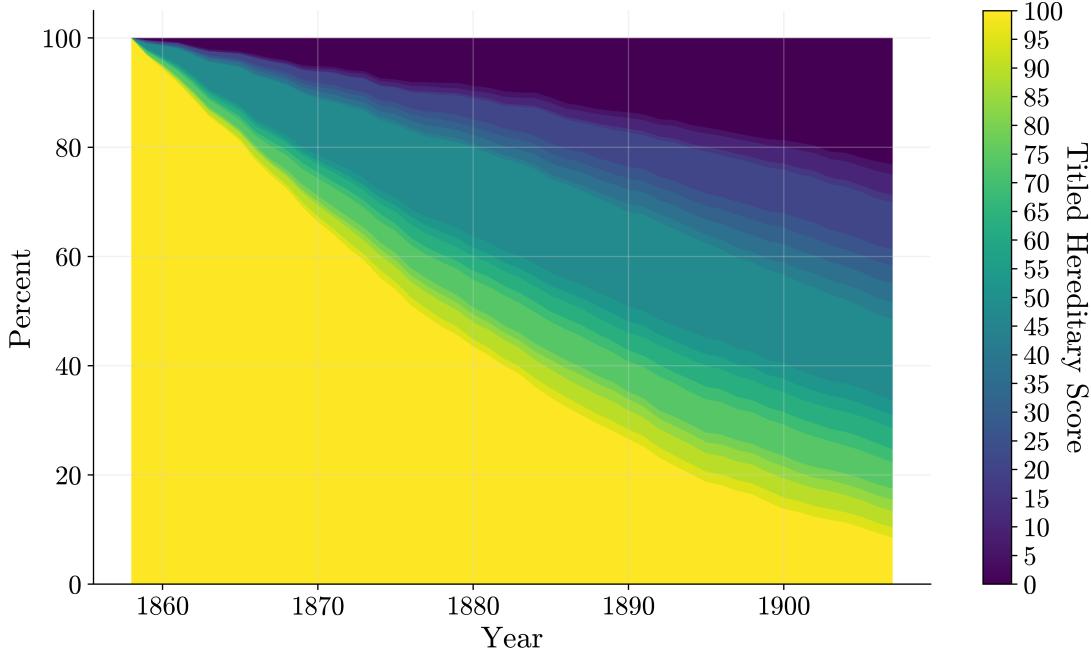
Entrance to the aristocracy was governed by two mechanisms, title-grants and marriages. I devise a novel metric, ‘hereditary background’, drawing on long-run genealogical data, to examine their joint effect. I then turn to examining the two channels separately. The results show a significant shift in the background of title-holders during this period. These shifts reflect two phenomena, the long-standing openness of the titled aristocracy, and distinctive changes during this period. In particular, changes to the origins of new recruits, and to number of new-title holders granted titles. Together, these results indicate the importance of recruitment, both as an established strategy and as a response to crisis.

7.3.1 Hereditary Background

I construct a new measure of the hereditary background of title-holders. This has the advantage of combining various phenomena: marriages, births, deaths, and title-grants, into a single measure which summarises an individual’s lineage. Existing measures look at shifts to in-group versus out-group relations. For instance, marriages within the aristocracy (Marcassa et al., 2020). These ‘hereditary scores’ provide more granular detail on the social background of those from the out-group, in particular, how closely intertwined their family has been with the in-group.

A central feature of genealogical histories of the peerage and baronetage is that they record the extended family tree of each title-holder. For instance, if we look at a random example from *Burke’s Peerage and Baronetage*, Sir Ernest Pennington Burrows, 3rd Bart., born 1851, we will see that not only is his first titled ancestor, Sir George Burrows, 1st Bart., recorded, but also the family up to Sir George

Figure 5: Hereditary Background of Title-Holders



Note: Based on the 3.9k living title-holders in Lundy's *The Peerage*. See Appendix ?? for details on measurement. A value of 100 means all descendants can be traced to title-holders from 1858 or before, and a value of 0 means no descendants can be traced to this group.

Burrows' great-grandfather (Burke and Burke, 1914, p. 342). The data contains information on 3.9k title-holders alive between 1858-1907, and 186k relatives born before 1907. For each title-holder alive between 1858-1907, I capture an average of 4,765 direct ancestors. Even for those granted new titles in this period, I capture 1,243 ancestors. This represents between 10-12 generations worth of ancestors.⁸ If there is meaningful information about a title-holders hereditary background, it should be captured here.

Using this information, we can estimate each individual's hereditary background, moving down the family tree. An individual's score is simply the average of their parents score. The easiest way to calculate this is to think of the genealogical data as a directed network. Each child is connected to two parents. They are assigned a score: 100, if they are a pre-1858 title-holder, or the average of their parents scores, which is itself either the average of their parents scores, or a specific 'unknown background' value, set to 0 in the baseline specification for unknown parents. This relies on two assumptions. Firstly, that if parents had a meaningfully titled background, they would be reported. Second, that although titles are only passed on through the male line, an individual's social background is equally inherited from both sides. Nonetheless, the results are not sensitive to either of these assumptions, as evidenced by various alternative assumptions (see below).

Descriptive results are presented in Figure 5. This shows, for each year, the percent of living title-holders with a specific hereditary background score. We can think of this as showing the proportion of their hereditary background that comes from pre-1858 title-holders. Across the period the composition of the titled aristocracy shifts substantially. In 1858, all title-holders have a score of 100, by construction. We see the gradual infiltration of those with no titled background at the top, as well as their descendants. However, much more noticeable is the mixing of already titled families with outsiders through marriage. By 1907, the proportion descended purely from pre-1858 title-holders has dropped to just 12%. While this is still substantial, title-holders from a purely titled background are in the minority. This is in a sense

⁸Though the family tree is often incomplete, so these actually represent a larger number of incomplete generations.

unsurprising, considering that there are only around 1.3k other titled families to marry into. Nonetheless, the extent of this mixing is impressive. By halfway through the period, 20.7% of title-holders are from a less than 50% titled background. By the end, this is 45.8%. Partly this was an underlying process, but that process accelerated substantially across the period. After the 1880s, titles were granted to outsiders at ever higher rates.

7.3.2 Robustness

There are three features that these results might be sensitive to. These are: the backgrounds of unknown individuals, the completeness of the genealogical network, and the transmission of background through the maternal line.

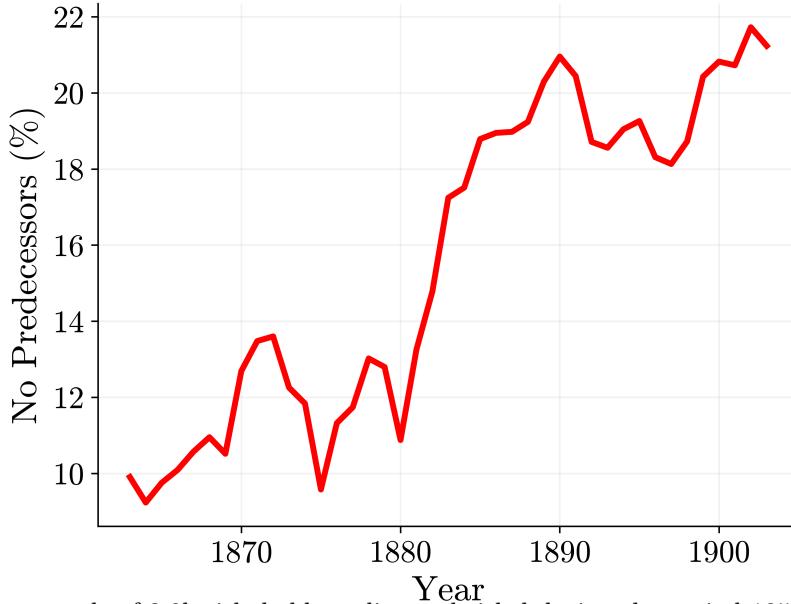
Background of Unknown Individuals—While it is safe to assume that those individuals who are not listed in these records are not title-holders, it may be too strong to assume that they have no connection to the titled-aristocracy. We can address this by checking whether the results are sensitive to assumptions about their background in the other direction. I conduct a robustness test where I estimate the average hereditary score for individuals where we know both grandfathers, using only direct observation of the grandfathers, rather than relying on the extended network. This removes the reliance on the scores of unknown observations. Each grandfather contributes 50% of the score. This gives an expected score for all non-titleholders, where we know the grandparents. I re-run the estimation, using this score for all individuals of unknown parentage, as the expected value of a non-titleholder. This is likely to overestimate their hereditary background, as they are less likely to come from a titled background than those for whom we know grandparents. Still, it has no significant impact on the results (Appendix F.2).

Genealogical Network Completeness—It is possible that the incompleteness of the network could attenuate the results. If for instance, we removed all the title-holders from the network, this would downwardly bias our results. This is a less important concern here because we are unlikely to be missing title-holders, and everyone else who is missing, we can assume is not a title-holder. Nonetheless, if we were missing the titled forebears of non-titled individuals in recent generations this would lead to an underestimation of their score. We can test the effect of indiscriminately removing data, even if this is not a particularly likely scenario. I remove all individuals born before 1700 (20% of the total data). While this does reduce the average hereditary score, the effect is relatively limited (Appendix F.2). This is even though removing data in this way disproportionately effects the number of title-holders in the data. There are 12.7% of title-holders in the missing data, whereas this is only 7.8% in the overall dataset. For this to have had any substantial impact on the overall picture, we'd have to assume an even more disproportionate amount of missing title-holder data, which is unlikely.

Maternal Transmission—In the baseline specification I assume that the background is passed equally through mothers and fathers. However, we might be concerned on both theoretical and practical grounds that this is not the case. Namely, we might be concerned that while the mother's family is important, it is her father who matters most. This is reflected in the sources, which typically record the father of each woman listed, but not always the mother. This implies that it is his status that matters most. We can adjust for this, by only using the scores of men in the maternal line. I conduct a robustness check, where I calculate this recursively. That is, the mother's score is comprised of her father's score (50%), her mother's father's score (25%), and so on, reweighting for how much information we have about men in the maternal line. This is likely to over-estimate her score, as each female in that line is more likely to be recorded if they have a titled father. Nonetheless, this also has no noticeable impact on the results (see Appendix F.2).

Overall, this period saw thorough mixing between title-holders and other proximate individuals. These features explain only minor variations in the measure. Next we will look at the extent to which new-comers joined, and how the hereditary background of these joiners shifted over time.

Figure 6: New Titles Among New Title-Holders



Note: Based on records of 3.9k title-holders alive and titled during the period 1858-1907, from Lundy's *The Peerage*. Show the percent of title-holders who received their title in a given year, whose title was not previously held by anyone else. Plotted as 10-year moving average.

7.3.3 Title-Grants and Marriages

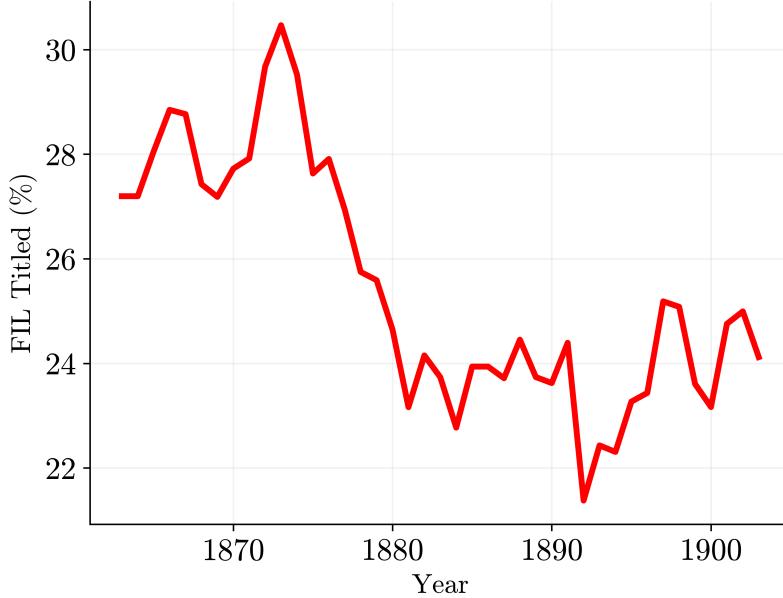
The hereditary background of title-holders changed through two mechanisms. Title-grants and marriages. For both, we need to consider how many ‘outsiders’ were joining, and where these outsiders were coming from. Each tells a different story. While title-grants represented a top-down shift to the composition of the titled aristocracy, initiated by its leadership, marriages represent a bottom-up change, initiated by its members.

Figure 6 shows the proportion of title-holders who became titled in a given year who were the first holders of their title. In total 2.7k individuals were granted titles during this period. There is a substantial increase in this proportion, from 10% at the start of the period to 22% by the end. The raw number of individuals gaining their title also rises substantially over this period, from an average of 5 per year between 1858-62 to 17 between 1903-07. Some of these new titles were granted to the junior offspring of existing title-holders, 8% in total, however that practice was declining over time. It constituted 9.5% of new titles before 1883, and 7.5% after. The titled aristocracy was surprisingly open even at the beginning of the period. However, there was clearly a step change after 1880. If there was a response to the crisis, perhaps it is to be found here, rather than in measures of wealth. This fits more with the view of ‘fragmentation’ than impoverishment.

There is a significant change in the background of individuals being granted new titles. New grants were primarily given to those without any recorded ancestors in the titled aristocracy, 69.5% of the total. Nonetheless, this rose substantially over the period. In the first ten years of the period, 45.3% of title-holders with ‘new’ titles had no recorded titled ancestors. By the last ten years, this was 79.2%. Not only were more outsiders joining, they were more distinctly outsiders than ever before.

Marriages show a similar picture, though the extent of change is more limited. Figure 7 shows the percent of title-holder’s marriages, where the father-in-law was titled. There are 4,320 marriages of male title-holder in this period, of which there are 4,250 where the father-in-law is known, shown in the figure. These include marriages of individuals who had not yet received their title, but would later become titled.

Figure 7: Title-Holder Marriages



Note: Based on records of 4,250 marriages of title-holders during the period 1858-1907, from Lundy's *The Peerage*, where the father-in-law is known (out of 4,320 total). Shows percent of marriages where the father-in-law was titled. Plotted as 10-year moving average.

What is immediately striking is how prevalent marriages outside of the titled aristocracy were, even at the beginning of the period. Even in the 1860s less than 30% of title-holders marry the daughters of other title-holders. These results are similar to those found by Goni (2022) for 1861, and for Marcassa et al. (2020) for the period between 1500-1800. This figure is notably lower for baronets than for peers. Only 16.7% of baronets marry the daughters of title-holders, whereas 36.8% of peers do.

While marriage patterns do change, they are notably more stable than title-grants. Even the background of marriage partners is relatively stable, though again, distinctly non-titled. In the first half of the period, 71% of marriages were to daughters of non-title-holders, in the second half this is 76%. Similarly, the percent of these non-titled father-in-laws with no recorded background in the titled-aristocracy is high, around 78%, but is constant across the period.

From this perspective, attempts at the family-level to incorporate new wealth appear to be a relatively long-standing strategy, whereas the granting of new titles appears to have responded more acutely to this crisis.

8 Discussion

The literature on the decline of the British aristocracy, while rich, has been loosely defined. By using systematic measures of persistence, we can assess which strands of the narrative are the more important. This is a nuanced debate, where even within a single author's work we find elements of both 'continuity' and 'change' (Cannadine, 1990, p. 4-5). The question then, becomes one of emphasis. By measuring these contrasting features, we can begin to unravel their impact on the overarching narrative. There was extraordinary persistence in terms of wealth, alongside notable social changes. These are not two contradictory narratives, but part of a single explanation of how the titled aristocracy persisted.

We can see this explanation interwoven into the stories of individual title-holders. As we saw in Section 7.1.1, the wealthiest title-holders were all new entrants. However, we see similar stories of social change and financial persistence if we look at more long-standing families. The largest personal estate

of an ‘old’ title-holder dying in this period was that of Edward Henry Stanley, 15th Earl of Derby, who died with 2.1m (1907£), who died in 1900. On his mother’s side, the family had only been titled one generation prior. The mother’s father, Edward Bootle-Wilbraham was the first in his family to receive a title, that of 1st Baron Skelmersdale in 1828. He was himself the son of a landowner and the daughter an East India Company director. Similarly, Edward Henry Stanley’s father was the son of both a peer and a reverend’s daughter. Undoubtedly the backgrounds of these ‘outsiders’ changed over time, but relatively open marriage seems to have been a longstanding trait of the aristocracy.

To an extent, recruitment in a system based on primogeniture is inevitable. The number of titled families is limited, increasing the difficulty of finding an assortative match internally. Difficulties in maintaining the male line also mean that titles are frequently rerouted through the family tree (Stone and Fawtier-Stone, 1984). In this period, the average number of offspring for a title-holder was 4.2. This means that in each generation, roughly 6% of titled families would not produce a son. After 4 generations, the chance that the male line has failed in at least one generation is 23%. Relatives outside the main titled line were constantly being brought back into the fold. So if these various forms of recruitment, through marriage, title-grants, and inheritance were relatively common, why the sense of crisis?

The explanation probably lies in who these outsiders were, and how that changed over the period. Historically, these recruits seem to have come from more compatible backgrounds. Between 1700-99, only 10% of new peers lacked a marital or hereditary relationship to existing peers (Stone and Fawtier-Stone, 1984, p. 283), though including marriages makes this difficult to compare directly. Over the period, there were more and more new title-grants, and they were increasingly going to outsiders. This social dilution is the focus of Cain and Hopkins (2016) and Cassis (1994). Between 1890-1914 (Cassis, 1994, p. 204) finds that 35% of bank partners and directors were marrying aristocrats or landowners. This signals a significant shift. Change in terms of marriage patterns appears to have been mostly concentrated in the upper-ranks of the aristocracy. Around 31% of peers married internally, versus 14% of baronets (Appendix F.3). However, most of the decline in internal marriages in this period was from peers, who dropped by 33%. There is certainly scope for more work on who these outsiders were, and how this affected the long-run trajectories of aristocratic families.

This speaks to a broader agenda in the literature on social mobility. For Clark (2014), there are various aspects of status which are noisy indicators of ‘latent’ status. This observed status is linked to latent status by some random component, which averages out at the family level. We can think of this latent status as the composite of all other types of status or capital: financial, human, social and cultural. These different types of capital can be affected by different forces, and the relationship between them might change. Systematic shifts might bias the measure if, for instance, there are incentives to switch from holding one form of capital to another. One example would be the mechanism demonstrated here. The terms of trade are favourable towards exchanging social for financial capital. This means the stock of financial capital is more persistent, while the stock of social capital gradually diminishes. In this instance, surname-measures are a less attenuated estimator for intergenerational persistence in financial terms, but do not reflect shifts in latent status. Developing measures of persistence purely in social terms, helps us distinguish between these explanations. It lets us dive deeper into the reasons for low social mobility at the surname, multi-generational level. Clark and Cummins (2014) and Clark and Cummins (2015) argue that it is within-family capital transmission that is the main determinant of outcomes for future generations. However, they do not distinguish between the roles of social, human, cultural or genetic capital.⁹ Dividing these measures along social (or ethnic) lines helps illuminate the role that different forms of capital play in persistence. There is ample scope for future research, identifying the role of social or cultural capital more explicitly.

We can think of this exchange of social and financial capital in the context of broader institutional processes. North et al. (2009) argue that the key conditions necessary for a transition from ‘limited access’

⁹Though Clark’s yet unpublished research emphasises the role of genetic capital.

(autocratic) to ‘open access’ (democratic) society is open and competitive access to organisations. They emphasise that existing elites will only expand access when it improves their welfare. While they describe this as primarily a political process, we can also think of this as a social process. Elites expand access to rights or privileges for non-elites when it is in their interest to do so. If the economic resources of elite diminish relative to the rest of the population, these incentives strengthen. We could think of this as inflation of financial capital relative to social capital.

However, the implications of this exchange of social for financial capital are unclear. This depends heavily on the mechanisms that govern the production and exchange of social capital, for which there are no clear answers. Bourdieu (1986) divides capital into: economic, cultural and social. In particular, he defines social capital as ‘connections’, giving the example of a ‘title of nobility’. However, while being titled may be a reasonable proxy for certain types of connection, it is not synonymous with ‘connections’. Indeed, we have seen how the relationship between these two things can change drastically over time. It is unclear how we should view the formation of connections, for instance marriages. On one hand, we could think of this as the exchange of capital. Title-holders receive financial capital, and in return outsiders receive social and cultural capital. If it were purely an exchange, then we would expect persistence in terms of financial capital to belie a long-run decline in social capital. However, we can also think of these connections as part of the process of producing social capital. Network literature emphasises the value of connecting to distant parts of the network (Granovetter, 1973). Marrying into outsider families also brings value new connections, whereas marrying the daughter of another title-holder, already well integrated into your network, might bring relatively little. Rather than viewing changes to marriages and title-grants as emblematic of declining social capital, we could think of them as improvements to production technology. Another route is to think of this as an exchange of ‘embodied’ cultural capital, rather than social capital. These social changes have an effect on individual character, diluting the particular cultural advantages formerly held by the aristocracy. There is little work which distinguishes empirically between the production and exchange of social capital, or indeed of cultural capital, but the aristocracy offers an promising avenue to explore this further.

9 Conclusion

So, did the titled aristocracy collapse during the Second Industrial Revolution? This paper provides evidence that it did not, at least not in a financial sense. Not only did it not collapse, but its persistence in terms of wealth was uniquely high. These findings, by drawing on detailed genealogical data and millions of observations of individual wealth, demonstrate the importance of approaching the question of aristocratic persistence with various, clearly defined measures. These show a complex, multi-faceted narrative, where social adaption was leveraged for economic persistence.

The use of descriptive measures which track average status, rather than representation among top wealth percentiles, has a major impact on the narrative. While title-holders were less prevalent amongst the wealth elite, an important story in itself, this did not mean that they were suffering from a shock to their wealth. In fact, under the system of primogeniture, this is an inevitable outcome of population growth. The choice to track of whether to track only existing families, or to also include new entrants also changes the picture significantly. In settings like this, where recruitment was central to the strategy employed by the aristocracy, separating these measures shows us the persistence of those families, versus of the institution. It tells us how much persistence in financial terms was predicated on compositional changes, and how the price of entry changes over time. In the late nineteenth century, new recruits bolstered the wealth of the titled aristocracy significantly, and the gap between them and longstanding title-holders only widened.

By measuring the social mobility of those with titled-surnames, and comparing this with the patterns of those with equally wealthy, but non-titled surnames, I show that title-holders were subject to a lower

mobility regime. This mirrors the findings of Collins et al. (2022), and emphasises the importance of disaggregating measures of social mobility. The literature on the British aristocracy contains no equivalent measures, but they are vital to properly benchmark the performance of the titled-aristocracy. Here, title-holders did not exhibit higher intergenerational wealth elasticity, but instead the next generation reported a wealth that was constantly higher. This has two important implications. Firstly, that those with titled-surnames were not regressing towards the population mean, and would have found a floor to their downward mobility. Secondly, that their lower rates of downward mobility did not interact with their wealth, and can only be explained by some other factor, for instance social, cultural or human capital.

Despite this exceptional persistence in terms of wealth, the composition of title-holders in social terms changed substantially over this period. This was partly a reflection of longstanding phenomena, and partly a response to the crisis of the 1880s. The share of titles which were granted for the first time rose substantially during this period. These were increasingly granted to those with no titled ancestors. While the percent of title-holder marriages to outsiders only increased marginally, it was remarkably high even at the beginning of the period.

This paper has a number of important implications. The decline of the aristocracy has been over-emphasised in the historical literature, while there are certainly elements of continuity and change, I find stronger evidence for continuity. Even channels that encouraged change, for instance marriage, were the expression of a continuous strategy. The exceptional persistence of the titled aristocracy in terms of wealth emphasises the extent to which existing research on aggregate social mobility may miss important heterogeneity in outcomes. It provides some of the first empirical evidence for the role of social capital in long-run family persistence. This has important policy implications. It helps to distinguish between different elements of status that could explain the extreme levels of immobility observed by Clark (2014). In particular, regression of titled surnames towards a level higher than the mean suggests the near-perpetual presence of these elites at the top of society, in the absence of major external shocks.

This research opens several new avenues for exploration. The most obvious is to expand these measures: of new and old entrants, of average wealth and representation at the top, of social mobility relative to other groups, of hereditary background, and of recruitment; to cover other aristocracies, and to look at a longer period. Beyond this, it would be helpful to have better measures of marital matching, both in terms of wealth, which would require linking the marriage data to the probates, and in terms of social or occupational background of outsiders.

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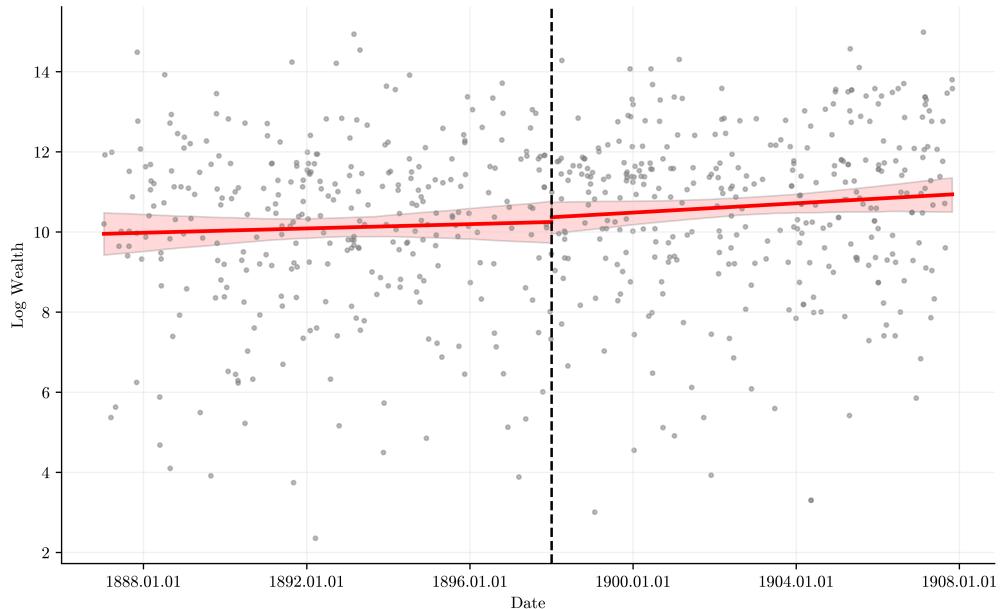
Appendix

A Data

A.1 Unsettled Realty and Discontinuities in Wealth Measurement

One of the concerns we might have about the probate records is that we are downwardly biasing wealth estimates before 1898, because these records don't contain unsettled realty. Here I test for the impact of the introduction of settled realty on the probate valuations of title-holders. Figure 8 shows the discontinuity in wealth before and after 1898.

Figure 8: Titled probate valuations, before and after unsettled realty



Note: Based on 648 PPR records containing title-holders between 1888-1907. Y-axis is log wealth, in 1907£. X-axis is date of death. Vertical black line is the addition of unsettled realty to probate valuations. Red-shaded area is 95% confidence interval.

To check formally for a discontinuity, I run a regression looking at title-holder probates in the 10 years before and after the discontinuity. I use wealth as the dependent variable, a constant pre/post variable, a running variable for distance from 1898, and an interaction term between these:

$$Wealth_i = \alpha + \beta_1 Post1898_i + \beta_2 YearsSince1898_i + \beta_3 (Post1898_i \times YearsSince1898_i) + \epsilon \quad (5)$$

The α term captures the average wealth pre-1898, the β_1 term captures the break in average wealth in 1898, β_2 captures the growth rate of wealth pre-1898, and β_3 captures the change in growth rate after 1898. The results are presented in Table 3.

Table 3: Wealth Discontinuity Regression

	(1)
Intercept	121500.00 (31300.00)
Post 1898	-32700.00 (48700.00)
Years since 1898	-24.24 (5053.16)
Interaction	17230.00* (8349.70)
Observations	648.00
R-squared	0.02
F-statistic	3.76

Notes: Estimates from 648 observations of title-holder wealth at death from 1888-1907.

***: $p < 0.001$ **: $p < 0.01$ *: $p < 0.05$.

The coefficient for *Post1898* is not significant, and in fact is negative, indicating that there is no significant jump in wealth recorded in probates for title-holders before and after 1898. The interaction term is weakly significant, suggesting that the wealth recorded in titled probates grew more rapidly post 1898 than before, but a change in the growth rate is more suggestive of changes in general economic conditions, than asset inclusion.

A.2 Probate Inventory Distribution, Green and Owens (2013)

We can get a sense of the share of total wealth comprised of the missing real estate component by looking at full probate inventories. Green and Owens (2013) sample 1,439 probate inventories between 1870-1902. The results are presented in Table 4. In the probate data there are 372 title-holders with over £100,000 of personality (26% of the total), who would not be included in these brackets. At least up until £100,000 the share of assets which are real estate is relatively constant across the wealth distribution. Though the *Return of Owners of Land, 1873* would suggest that this is not the case at the very top of the wealth distribution.

Table 4: Per cent of assets by gross values of estate, 1870-1902 (n=1,439)

Gross value of Estate (£)	Persons	Shares	Government Securities	Real Estate	Cash	Trade	Household	Mortgages, debts, bonds, rents due	Insurance	Other
<1,000	901	9.3	4.4	18.3	21.5	10.9	10.5	10.9	6.1	8.0
1,000-4,999	343	16.0	9.4	24.9	11.8	6.6	6.2	14.8	2.2	8.1
5,000-9,999	85	22.8	16.0	20.4	7.3	7.8	3.0	15.1	2.6	5.1
10,000-49,999	90	36.5	13.3	15.3	4.8	5.2	3.3	11.2	2.5	7.9
50,000-99,999	20	28.3	11.7	22.0	4.3	3.2	1.2	13.7	1.1	14.7
Total	1439	27.0	11.7	21.6	6.9	5.4	3.5	12.5	2.3	9.2

Notes: Reproduced from Green and Owens (2013).

B Data Construction

B.1 Scraping

I scrape 259k images of probate calendars from probatesearch.service.gov.uk, held under the *Open Government Licence*. I use the same methodology as Cummins (2021), automating the process using the *requests* and *BeautifulSoup* libraries in Python.

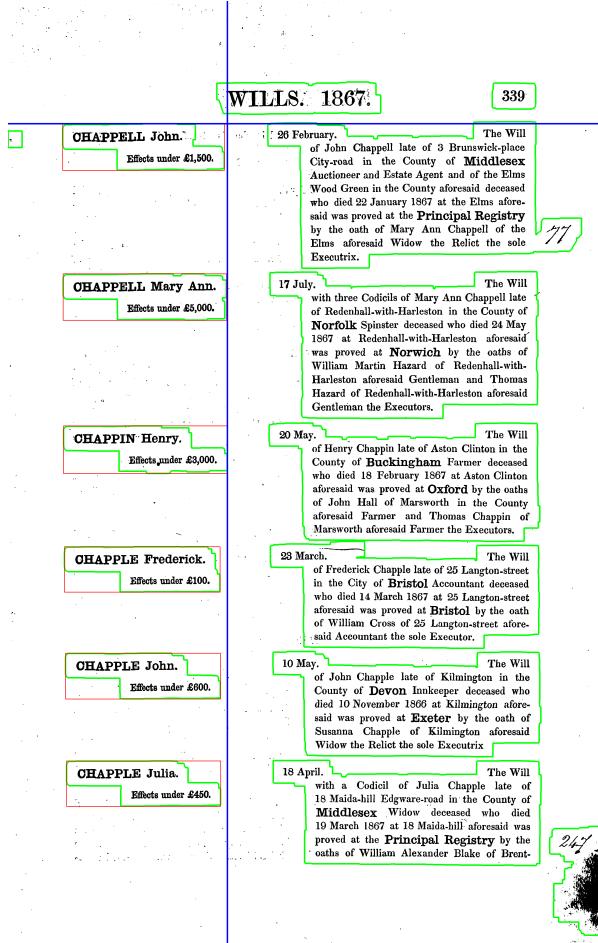
B.2 Page Segmentation and OCR

The transcription of the documents is straightforward. However, out-of-the-box OCR methods are unable to reliably predict reading order for these documents, so I implement a simple page segmentation algorithm using the *OpenCV* library.

The calendars come in two formats, 1858-1891 and 1892-1907. The approach is similar for both, I show an example of the first format in Figure 9. The aim of the image segmentation algorithm is to identify and segment each individual entry into a pair of images (1858-1891) or a single image (1892-1907).

I perform a number of pre-processing steps, and create a pixel map of the text box areas using dilation. In the first pass I identify the headers and columns, by creating countours and then bounding boxes around structured pixels, and applying some statistical rules to detect: boxes that are too small or large, areas where two boxes are conjoined, etc., and apply further processing to these. In the second pass, I use these bounding boxes, and their position, to segment the image. I use the position of text in the left hand column to create a segmentation grid, as these are more distinctly positioned. Finally, I transcribe these sub-images into text using the *tesseract* OCR engine.

Figure 9: Image Segmentation, First Pass



B.3 Text Analysis

Text from the OCR process is then parsed into variables using Regular Expressions. I extract the following variables: surnames, forenames, wealth, title, and date of death. I classify each title into one of the following ranks: prince, duke, marquess, earl, viscount, baron, lord, baronet, knight. For an example of a titled probate see Figure B.4.

B.4 Example Title-holder Probate

Figure 10: Probate Entry for Sir Edmund Walker Head

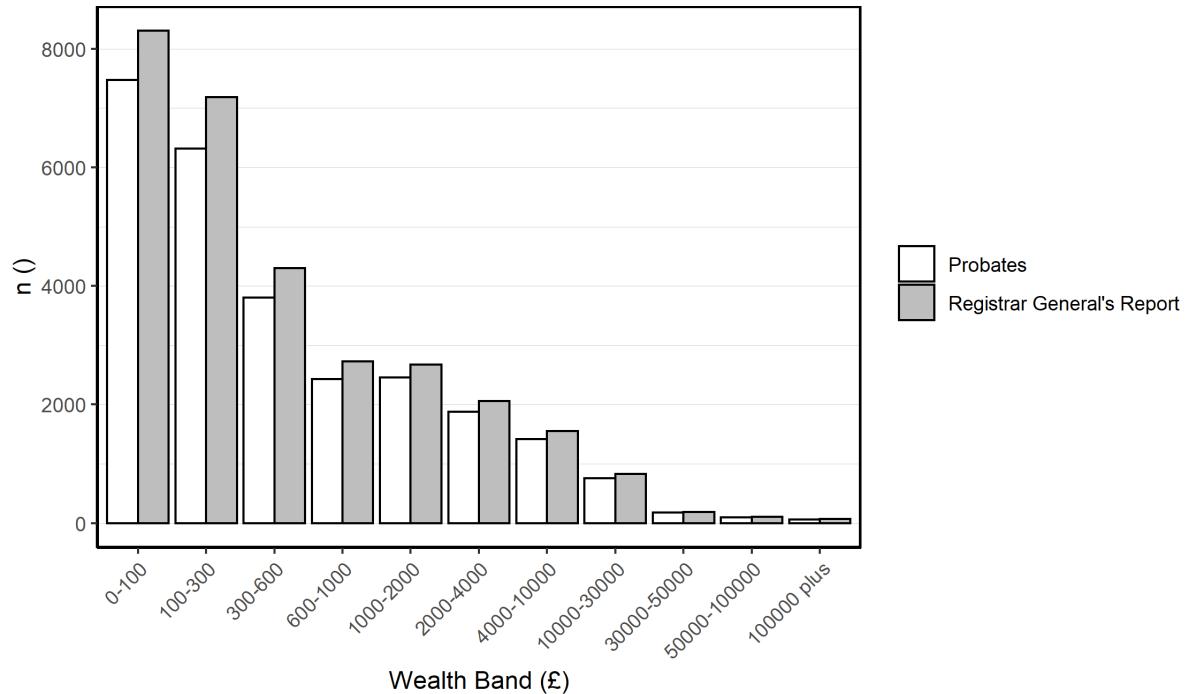
The Most Honourable Richard Grosvenor Marquess of WESTMINSTER K.G. 20 December. The Will with five Codicils of the Most Honourable Richard Grosvenor Marquess of Westminster K.G. late of Eaton Hall in the County of Chester of Motcombe House Shaftesbury in the County of Dorset and of Grosvenor House Upper-Grosvenor-street in the County of Middlesex deceased who died 31 October 1869 at Fonthill Gifford in the County of Wilts was proved at the Principal Registry by the oaths of the Most Honourable Elizabeth Mary Dowager Marchioness of Westminster of Motcombe House aforesaid Widow the Relict the Right Honourable Thomas Augustus Wolstenholme Earl of Macclesfield of Shirburn Castle Tetsworth in the County of Oxford and Sir Michael Robert Shaw Stewart of 42 Belgrave-square in the County of Middlesex aforesaid Baronet the Executors.
797 Effects under £800,000.

Note: from PPR calendar, 1868.

B.5 Data Checks

Besides the manual checks mentioned in the Section 5.1, I also compare the constructed data to existing estimates. In 1861, the Principal Probate Registry published a report of aggregate statistics from the 1858 probate calendars, I compare the distribution of my data in 1858 to these (Figure ??). These follow a similar distribution to my constructed data.

Figure 11: Probates, from RGO Annual Report (1861) and Data Construction Pipeline



Notes: 'Probate' statistics calculated from 26,868 individual PPR calendars from 1858. RGO statistics calculated from aggregated figures for 29,979 probates from 1858 in Annual Report of the Registrar General, 1861.

C Linking

Both the probate calendars and *The Peerage* contain extensive information on title-holders, meaning that matching them is a relatively straightforward and robust process. Below, I present the information given in both sources for one example, the Duke of Bedford. I match these in full, using the original text, not just the variables extracted with regular expressions.

The Peerage

- Name: Francis Russell.
- Title(s): 7th Duke of Bedford (Primary), 7th Baron Howland of Streatham, 7th Marquess of Tavistock, 12th Baron Russell, 11th Earl Bedford, 9th Baron Russell of Thornhaugh.
- Date of Death: 14 May 1861.
- Place of Death: Woburn Abbey, Bedfordshire.
- Relations: Anna Maria Stanhope (spouse), William Russell (son).

PPR Calendar

- Name: Francis Russell.
- Title(s): Duke of Bedford.
- Date of Death: 14 May 1861.
- Place of Death: Woburn Abbey, Bedford.
- Executors: William Russell (son).

The Peerage also contains information on the date each title was granted, and the parents of the title-holder.

D Estimation

D.1 Death Registers, Adult Deaths

To estimate surname-level measures, such as social mobility, I need surname level adult mortality statistics. These are available for 1866-1907, but not 1858-1865. I combine the *Death Registers* and *RGO Annual Reports* to estimate surname-level adult mortality for 1858-165.

Using death register data, I calculate the average proportions of deaths which are from adults, for each surname between 1866 and 1907, this is denoted as \bar{P}_s^a .

$$P_{sy}^a = \frac{D_{sy}^a}{D_{sy}^c + D_{sy}^a}, \quad (6)$$

$$\bar{P}_s^a = \frac{1}{n} \sum_{y=1866}^{1907} P_{sy}^a \quad (7)$$

where D_{sy}^c and D_{sy}^a represent the number of child and adult deaths for a given surname in a given year, s represents a specific surname, y represents a specific year, a represents those aged 20 plus, and c represents those under 20.¹⁰

Using Annual Report data, I calculate the average proportions of deaths that are adult between 1866 and 1907, denoted as \bar{P}^a , and the proportion of deaths that are adult for the overall population for each year, denoted as P_y^a . For each year between 1858 to 1865 I calculate the ratio of adult deaths in that year to the average in 1866 to 1907.

$$R_y^a = \frac{P_y^a}{\bar{P}^a} \quad \text{for } 1858 \leq y \leq 1865 \quad (8)$$

I then calculate an adjusted proportion, which is the average proportion of each surnames deaths that are adult between 1866 to 1907, \bar{P}_s^a , multiplied by the ratio of the proportion of deaths from adults in that year to the average across 1866-1907, R_y^a .

$$A_{sy}^a = \bar{P}_s^a \cdot R_y^a \quad (9)$$

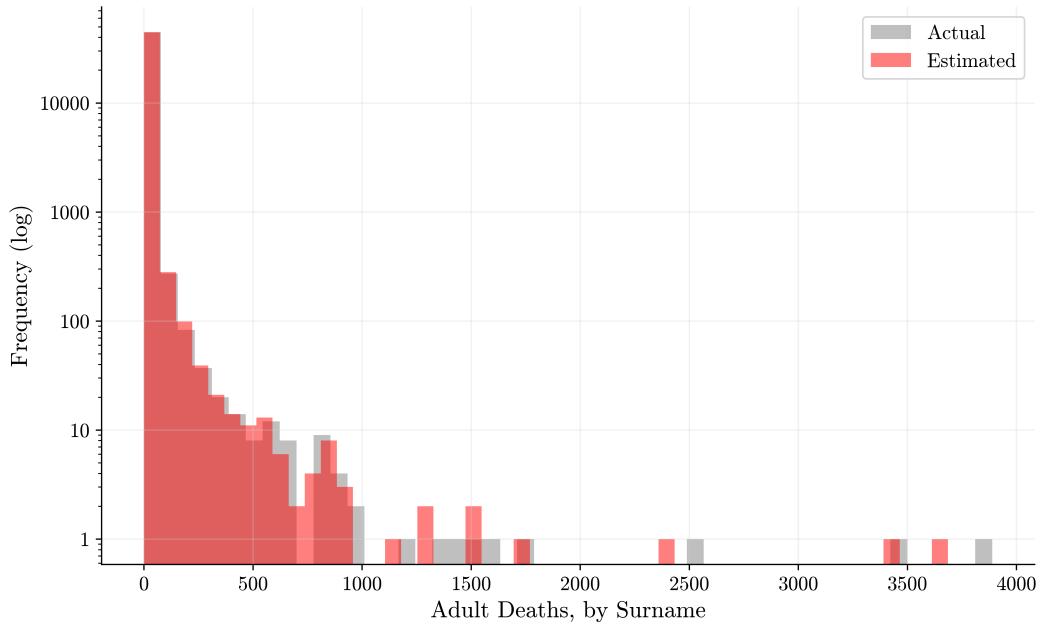
Finally, I multiply this adjusted proportion against the total number of deaths for each surname in each year D_{sy} to get D_{sy}^a , the number of adult deaths for each surname in a given year.

$$D_{sy}^a = D_{sy} \cdot A_{sy}^a \quad (10)$$

This gives me a surname level adult mortality estimate for the years 1858-1865. This method should capture changes in the number of deaths, changes in the relative proportion of child and adult deaths, and differences in the proportion of child and adult deaths between surnames. It assumes, however, that differences in adult versus child mortality between surnames are constant over time. Figure 12 shows the application of this procedure to 1866 data, where we observe this directly, using surname adult death rates from 1867-1907. The estimated number of adult deaths for each surname closely matches the real data from the 1866 death registers.

¹⁰for surnames that don't appear in 1866-1907, but do appear in 1858-1865 I use the average proportions of deaths for adults across the entire 1866-1907 population. Need to calculate what proportion this is.

Figure 12: Estimated vs Actual Adult Deaths, by Surname (1866)

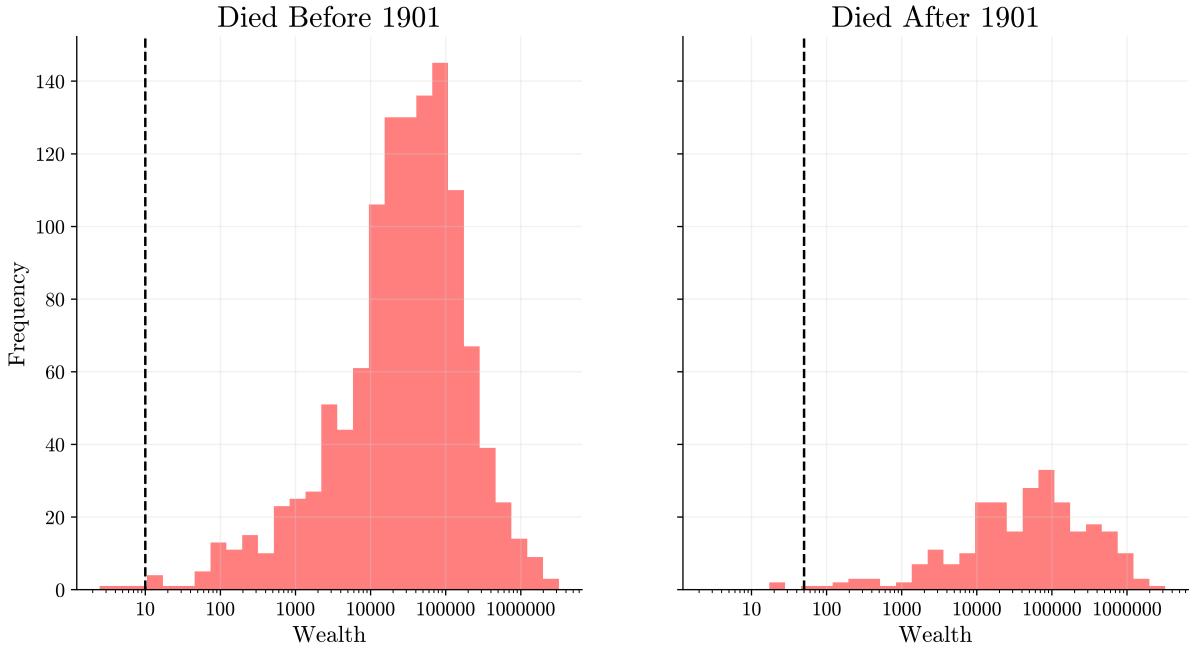


Note: Based on 258k deaths aged 20+ from the *Annual Report of the Registrar General's Office, 1866* and estimated deaths for the same year using the procedure above.

D.2 Title-holder Probates

Title-holders could be missing from probates for three reasons: they do not have enough wealth to be probated, their estate is completely hidden or held in trusts, or they are probated in a different jurisdiction. Assuming that all eligible title-holders are probated could inflate the wealth of title-holders, as I exclude those dying below the threshold from my sample. However, the number of these is likely to be small. Figure 13 shows the distribution of title-holder probates when the threshold was £10 (before 1901) and £50 (after 1901).

Figure 13: Probated Title-holders, against Probate Threshold



Note: Based on 1.4k probate calendars concerning title-holders. All figures in 1907(£). The figures plot the distribution of title-holding probated wealth when the threshold was £10 (pre-1901) and when it was £50 (post-1901). Individuals can be probated despite being below the mandatory reporting threshold.

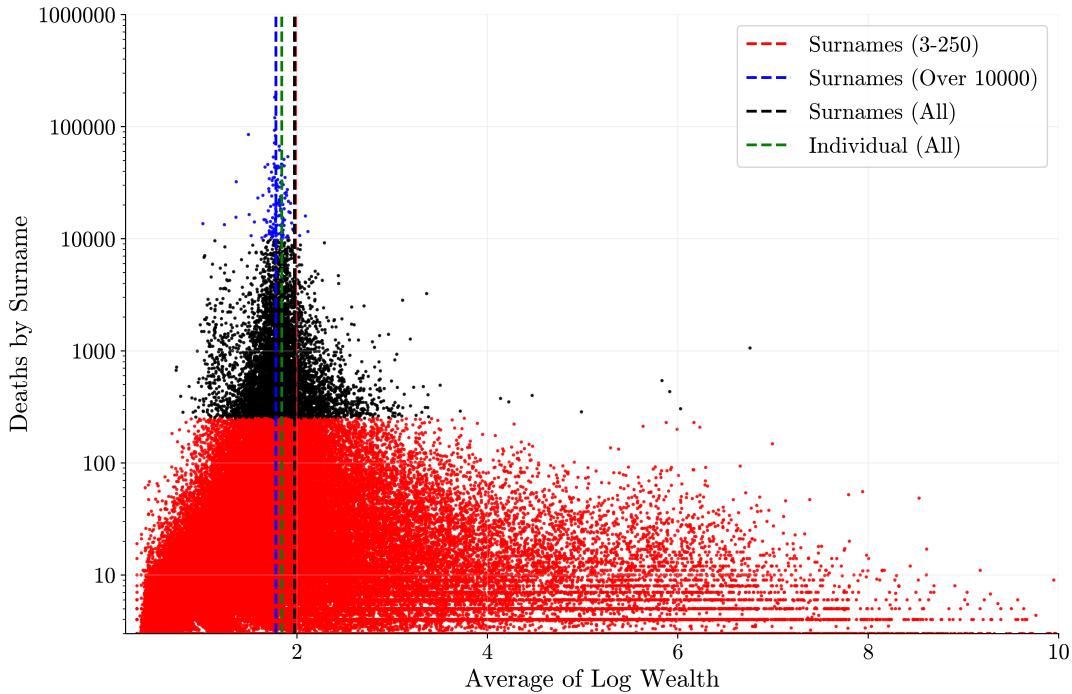
The figure includes some probated below the threshold, as this was the *mandatory* reporting threshold, but individuals could still be probated below it. This shows that only a tiny proportion of title-holders are close to being below the mandatory threshold (note the log scale). If the probates follow this distribution beyond the cutoff, there should be almost no unprobated title-holders. Consequently, assuming that all eligible title-holders were probated is going to affect our estimates by far less than assuming all non-matched title-holders died with no wealth.

E Social Mobility

E.1 Wealth Distribution of Surnames

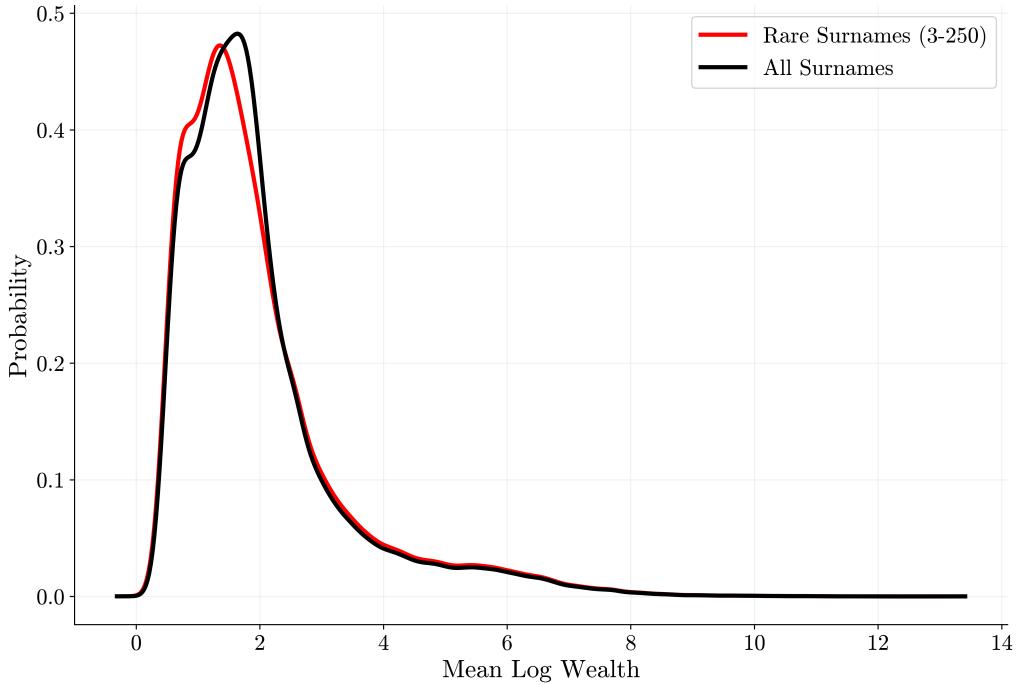
There might be concern that rare surnames do not follow the same distribution as the rest of the population, Figure 14 shows the distribution of wealth by surname rarity. As can be seen, the distribution of rare surnames approximates the distribution of wealth at the surname level. While common surnames more closely approximate the distribution of wealth at the individual level. These results do not show any particular wealth bias for rare surnames as defined in the paper. For a direct comparison of the distributions of rare and all surnames, normalised as a probability density function, see Figure 15.

Figure 14: Wealth Distribution, by Surname Rarity



Notes: Based on 2.2m PPR records, and records of 13.9m deaths from Cummins (2021). Distribution of wealth by surname frequency. Rare, 3-250 deaths between 1858-1907, is plotted in red. Common, over 10,000 deaths between 1858-1907, is plotted in blue. All other surnames are plotted in black. The red, blue, and black vertical lines represent the mean average log wealth at the surname-level, for rare, common, and all surnames respectively. The green vertical line gives mean log wealth at the individual level. The y-axis is plotted on a log scale.

Figure 15: Rare and Common Surname Wealth, Probability Density Function

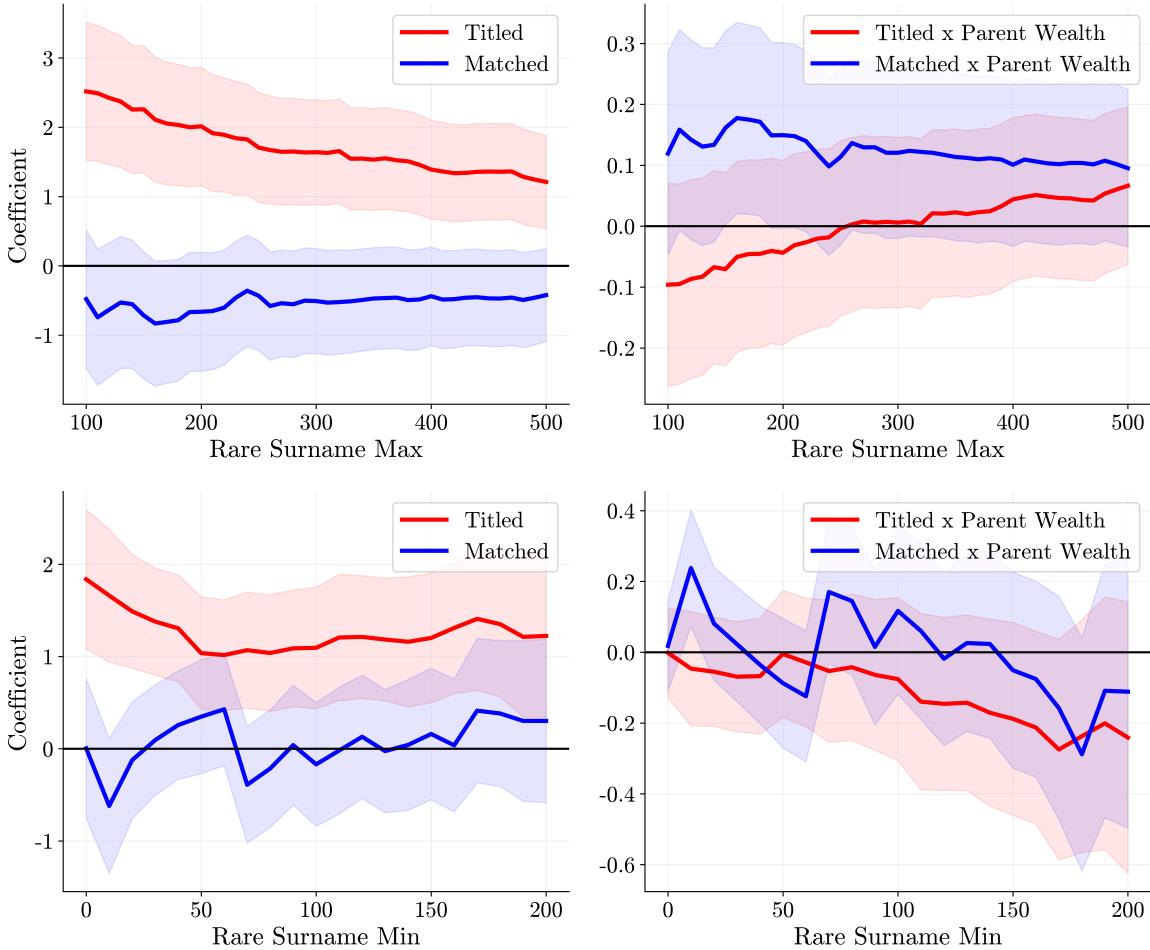


Notes: Based on 2.2m PPR records, and records of 13.9m deaths from Cummins (2021). Distribution of wealth by surname frequency. Rare, 3-250 deaths between 1858-1907, is plotted in red. All surnames are plotted in black. Plotted as a smoothed probability density function.

E.2 Robustness to Surname Rarity

To check whether the coefficients are an artefact of the construction of the rare-surname groups, I re-estimate the coefficients in Columns (2) and (4) of Table 2, using varying minimum and maximum thresholds for classification as a ‘rare’ surname (Figure 16). While larger surname groups do result in a loss of status information about the members of that group, these thresholds have no bearing on the results. Even increasing or decreasing these thresholds substantially has no effect on the significance of the coefficients of interest.

Figure 16: Social Mobility Estimates with Varying ‘Rariness’ Thresholds

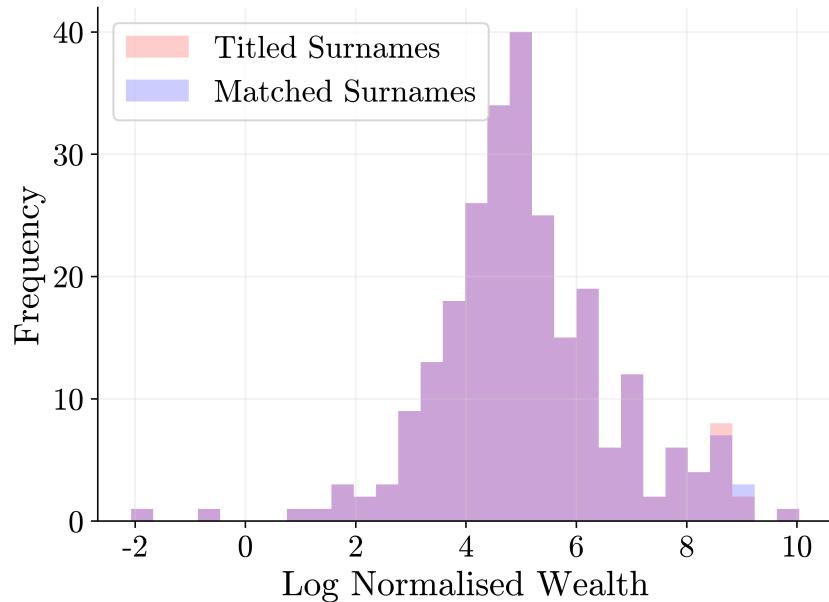


Note: This plots the coefficients of interest from Columns (2) and (4) from Table 2, but using different threshold definitions of ‘rare’ surname. The surname rarity bands are number of deaths between 1858-1907. Error bars represent 95% confidence intervals. The top two panels shows the effect of changing the maximum threshold for rarity, and the bottom two show the minimum threshold. The left two panels show the constant term for both groups, and the right show the interaction term.

E.3 Surname Matching

Figure ?? shows the distribution of wealth for titled and matched surnames.

Figure 17: Rare Surname Wealth, Title-Holders and Matched



Notes: Distribution of log normalised wealth for title-holding rare surnames, and matched surnames in Generation 1.

E.4 Robustness to Non-Probated Estimation Procedure

To check robustness to varying estimates of non probated wealth, I re-estimate the main regression results, using the minimum and maximum possible values for non-probated wealth, possible according to the thresholds for mandatory reporting.

Table 5: Social Mobility Estimates, Robustness to Non-Probated Estimation Procedure

	(1) Titled	(2) Matched	(3) Titled	(4) Matched	(5) Titled	(6) Matched
Intercept	-2613.05 (1368.30)	-2544.36 (1369.96)	598.41 (740.28)	641.28 (741.86)	330.07 (1047.20)	373.56 (1048.88)
Parent Wealth	0.54*** (0.00)	0.55*** (0.00)	0.52*** (0.00)	0.53*** (0.00)	0.50*** (0.00)	0.51*** (0.00)
Parent Wealth × Group	-0.05 (0.09)	0.02 (0.09)	-0.09 (0.05)	-0.01 (0.05)	-0.02 (0.07)	0.07 (0.07)
Group	1.97*** (0.53)	-0.14 (0.53)	1.69*** (0.23)	-0.09 (0.23)	1.73*** (0.38)	-0.32 (0.38)
Controls	YES	YES	YES	YES	YES	YES
Procedure	MIN	MIN	MAX	MAX	HMRC	HMRC
R^2	0.35	0.35	0.35	0.35	0.36	0.36
F-Stat	5.3×10^3	5.3×10^3	5.3×10^3	5.2×10^3	6.3×10^3	5.4×10^3
RMSE	2.41	2.41	1.31	1.31	1.89	1.89
Observations	67777	67777	67777	67777	67777	67777

Notes: Social mobility estimates for those with titled and matched rare surnames. For method see Section 7.2. This presents robustness checks, re-estimating the results with the minimum, maximum and preferred estimates of non-probated wealth, see Section 5.3.2. ***: p < 0.001; **: p < 0.01; *: p < 0.05

E.5 Projection Procedure

I calculate the expected wealth of titled and matched surnames in each generation, using the coefficients from Table 2, columns (1) and (3). This is meant to give an intuitive insight into what these trends would look like, projected forwards, rather than a precise estimate.

I start by estimating wealth in generation 0, denoted as W_0 , and the associated standard error SE_{W_0} , from the Generation 1 data on titled/matched surnames. These are just the mean and associated standard error of the wealth measure produced in Section 7.2.1, for titled or matched surnames, which by definition are identical.

For each generation, I then calculate the next generations wealth as:

$$W_g = W_{g-1} \times (\beta_{pop} + \beta_{group}) + \alpha_{group}, \quad (11)$$

where β_{pop} is the population intergenerational wealth elasticity coefficient, β_{group} is the additional intergenerational wealth elasticity experienced by the group, and α_{group} is the constant wealth bonus experience by the group.

Then, the standard error for each generation g where $g \geq 1$, I estimate a new standard error. We can calculate the standard errors associated with the population and group coefficient as:

$$SE_{joint} = \sqrt{SE_{\beta_{pop}}^2 + SE_{\beta_{group}}^2}, \quad (12)$$

from this, we can calculate the standard error in the wealth of the next generation as:

$$SE_{W_g} = \sqrt{(W_{g-1} \times SE_{joint})^2 + ((\beta_{pop} + \beta_{fam}) \times SE_{W_{g-1}})^2 + SE_{\alpha_{group}}^2}, \quad (13)$$

where $(W_{g-1} \times SE_{combined})^2$ represents the contribution of uncertainty in both intergenerational wealth elasticity coefficients to the wealth of the next generation, $((\beta_{pop} + \beta_{fam}) \times SE_{W_{g-1}})^2$, accounts for uncertainty in the previous generation's wealth, and it's impact on the next generation, and $SE_{\alpha_{group}}^2$ represents error added directly by the constant term.

F Social Composition

F.1 Measurement

The aim of the hereditary scores is to capture the extent of an individual's family background that comes from the pre-1858 titled aristocracy.

For instance, if an individual simply is a pre-1858 title-holder, then this score should be 100, as they themselves come directly from this background. If an individual's father is a pre-1858 title-holder, but their mother has *no* title-holding background, then this score is 50. However, for many individuals, even if they don't directly come from a title-holding background, they might have some distant ancestor who does. For instance, if the father is a pre-1858 title-holder his score is 100, if the mother then has a father who is a pre-1858 title-holder but a mother with no title-holding background she has a score of 50. Averaging these out, the child should have a score of 75.

Obviously this scoring system then relies on first calculating the scores of each individual's most distant ancestor, and then working down through the generations. To achieve this, I convert the entire genealogical database (*The Peerage*) into a network, and sort the individuals topologically, so that we calculate all of these scores in a chain of dependencies, starting with the least dependent individuals. I assign scores in the following manner:

- Individuals who hold a title during or before 1858 have a score of 100.
- Individuals who do not hold a title have a score which is an average of their parents scores.

- If a parent is not known, they are assigned an ‘unknown’ score, 0 in the baseline specification.

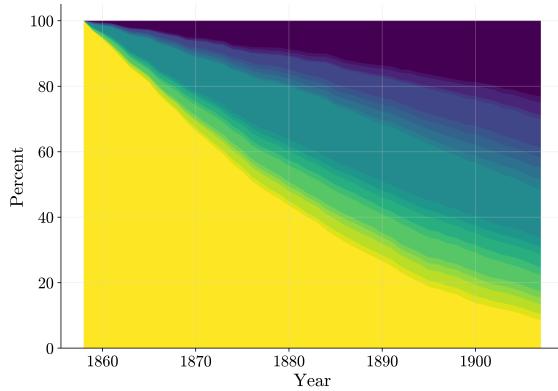
F.2 Robustness Hereditary

To check the robustness of the hereditary scores, we need to check sensitivity to three features: the incompleteness of family tree, the assumption that those with no recorded titled ancestors have no significant hereditary background, and that this background is equally passed through both branches. I present the results of all of these checks in Figure ???. Panel A shows the baseline specification included in the main text.

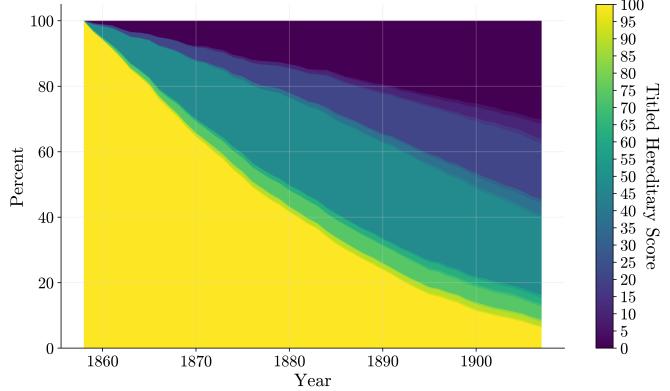
In Panel B I investigate the effect of missing data. I remove all individuals in the genealogical network born before 1700, then re-estimate the hereditary score. This changes the distribution of scores, pushing them towards the extremes, as over fewer generations, the extent of mixing is more limit. Nonetheless, it has little impact on the overall picture, only marginally decreasing the estimated hereditary scores.

Next, I check whether the results are sensitive to assumptions about the background of parents who are not recorded. I estimate a generic non-titled background based on those individuals from whom we know their grandparents. This allows me to calculate a score without relying on network dependencies, which would suffer from the missing data problem. I calculate this as 100 if both grandfathers are titled, 50 if one is, and 0 if neither are. The average score for non-titled individuals in this measure is 7.1. I then re-estimate the hereditary score, but for all unknown parents, I give them a score of 7.1. This is an upwardly biased estimate, because non-titleholders for whom we know grandparents are more likely to have a titled background. Nonetheless, because we have relatively complete data for a long period before 1858, this has a negligible impact on the results, shown in Panel C.

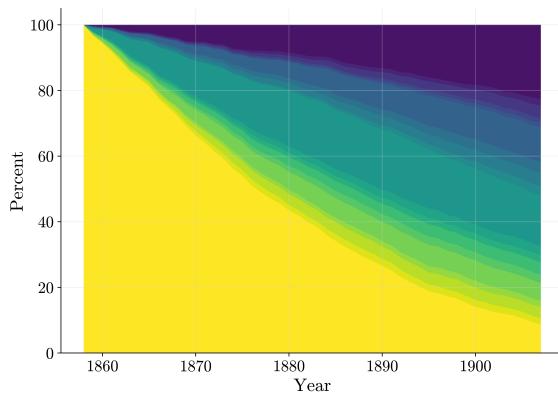
Finally, I check whether just using information on males has an effect on the result. As females could not typically hold a hereditary title, information about their background might not be as pertinent. Further, if the data is more likely to record the male line, then the assumption that because a female is not recorded, she has no titled background, is a stronger one than for males. I calculate a robustness check, where we only rely on the scores of males, even in the maternal line. The idea is that we can approach the score for the mother, by recursively scoring these male partners. That is, half of the mother’s score comes from her father, a quarter of it comes from her mother’s father, an eighth from her mother’s mother’s father. As we approach infinite generations, this score approaches the mother’s score. Of course, we do not have an infinite number of generations, but we can use this procedure to approach the total score of the mother. In each case I record a total weight, which captures the number of generations of fathers, e.g. 1 generation is only 50%, whereas 3 would be 87.5%. We can then divide the cumulative score by how much of her heritage we have captured, to estimate her expected hereditary background given the men that we know in the female line. On average, for each mother I can calculate 87.4% of her total score.



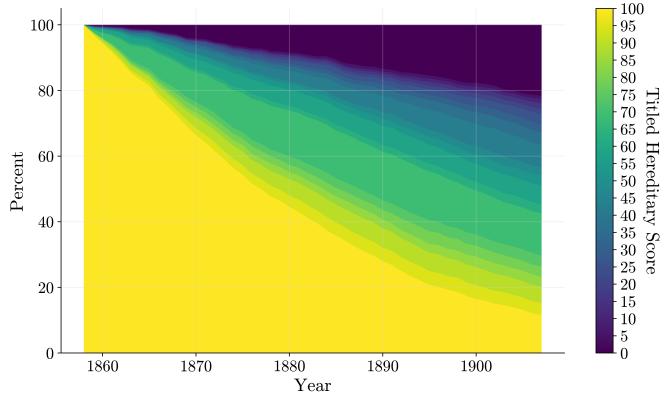
(A): Baseline



(B): Post-1700



(C): Higher Unknown Background



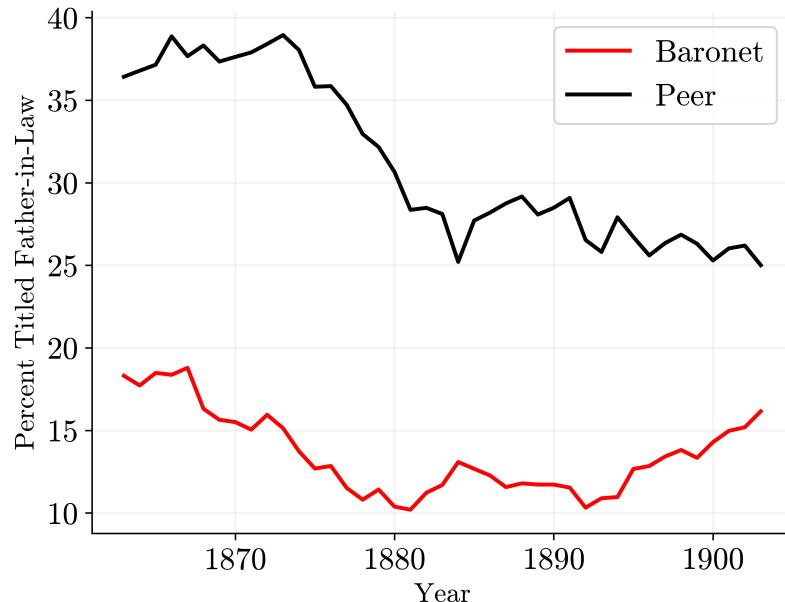
(D): Recursive Mother

F.3 Marriages and Title-Grants, Peers vs Baronets

I present the results from Section 7.3.3, decomposing the data into peers and baronets. Figure 18 presents the share of marriages where the father-in-law was a title-holder, for both peers and baronets. This shows that baronets were already substantially more likely to marry outside the title-holding aristocracy. However, the main shift in this period was in the marriage patterns of peers.

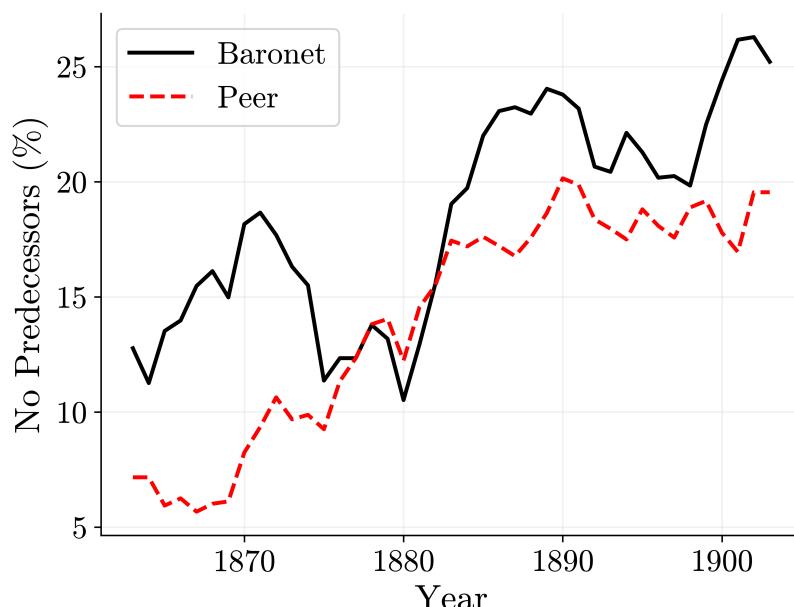
Figure 19, shows the percent of new baronets and percent of new peers in each year who were the first holders of their title. Here again, at the beginning of the period new titles were more likely to be created for baronets than for peers. However, the proportion of outsiders been granted peerages is what changes the most over this period, increasing substantially in the first half of the period.

Figure 18: Title-Holder Marriages, Peers vs Baronets



Notes: Based on records of 4,250 marriages of title-holders from the period 1858-1907, from Lundy's *The Peerage*. Shows percent of marriages where the father-in-law was titled. Plotted as 10-year moving average.

Figure 19: New Titles Among New Title-Holders, Peers vs Baronets



Notes: Based on records of 3.9k title-holders alive and titled during the period 1858-1907, from Lundy's *The Peerage*. Shows the percent of peers and baronets who received their title in a given year, whose primary title was not previously held by anyone else. Plotted as a 10-year moving average.