Assortative matching and persistent inequality: Evidence from the world's most exclusive marriage market *

Marc Goñi†

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Abstract

How much do search frictions affect the strength of marital assortative matching? Assignment theory suggests a strong link. This paper is one of the first to provide empirical support for this prediction. In the nineteenth century, for seven months each year, Parliament was in session and the British elite converged on London. Their offspring participated in a string of social events designed to introduce rich and influential bachelors to eligible debutantes. This "matching technology," known as the London Season, strongly influenced who married whom. After the death of Prince Albert, royal parties were cancelled for three consecutive years (1861–63). I exploit this exogenous shock to demonstrate the importance of the matching technology. Using a combination of hand-collected and published sources of information on peerage marriages, I find that the cohort of women affected by this interruption were 80 percent more likely to marry a commoner and that their spouses were markedly poorer. Geographical distance between spouses' seats also shrank, indicating that local markets became a more important source of partners. In addition to Prince Albert's death, I also use changes in the size of the marriageable cohort as a source of identifying variation. I then evaluate the implications of marital sorting for social mobility, inequality, and education. Comparing observed marriage patterns to a counterfactual in which there is no Season, I find that between 1851 and 1875, the rate of entry of newcomers into the aristocratic elite would have been 30 percent higher without this institution. Overall, the Season was important in sustaining the English nobility's role as an unusually small, exclusive, and rich elite. Highly effective assortative matching among the English elite also had important long-run implications for inequality and investments in education. I show empirically that, in a cross-section of counties, marital sorting and inequality of landownership reinforced each other. In addition, concentrated landownership reduced investment in education in England and Wales.

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†Universitat Pompeu Fabra, marc.goni@upf.edu

It is a truth universally acknowledged, that a single man in possession of a good fortune, must be in want of a wife. Jane Austen, *Pride and Prejudice.*

1 Introduction

Dentists marry dentists, Hollywood stars marry each other, and economists marry economists. Marital assortative matching — the tendency of people of similar social class, education, and income to marry each other — has important implications for education and inequality (Fernandez and Rogerson 2001, Fernandez et al. 2005). To investigate these implications further, it is crucial to first understand what drives marital sorting. Homophily — a preference for others who are like ourselves — is only one reason for assortative matching. In addition, the people we meet also circumscribes the set of mates we can chose from. In other words, every relationship not only reflects who we chose but also depends on who we meet. A robust prediction of marriage models is that search frictions affect marriage outcomes (Collin and McNamara 1990, Burdett and Coles 1997, Eeckhout 1999, Shimer and Smith 2000, Bloch and Ryder 2000, Adachi 2003, Atakan 2006, Jacquet and Tan 2007).

Confirming this prediction with data is not straightforward. Recent empirical work has used speed dating (Fisman et al. 2008), marriage ads in newspapers (Banerjee et al. 2009), or dating websites (Hitsch et al. 2010). Results are at odds with the theory — preferences appear to be an important determinant of sorting, but the matching technology does not seem to clearly affect the outcomes. Does this discrepancy reflect flaws in search theory or in modern-day data? Dating is very different from marriage. In most cases, it does not reflect the long-term partnership formation at the core of search and matching theory (Diamond 1981, Mortensen 1993, 1988, Pissarides 1984, Mortensen and Pissarides 1994). Relating marriage outcomes to the matching technology is also complicated by the fact that the latter is hard to measure. In modern marriage markets, members of the opposite sex continuously interact in a multitude of settings. As a consequence, it is virtually impossible to isolate a particular matching technology from other courtship processes.

In this paper, I use a unique historical setting to investigate these issues further. I examine the marriage strategies of the British upper classes in a search and matching framework. In the nineteenth century, from Easter to August every year, a string of social events was held in London to "aid the introduction and courtship of marriageable age children of the nobility and gentry"[1] — the London Season. It was at the heart of the British upper class social life, and almost all of the peerage and gentry was involved. Courtship in noble circles was largely restricted to London; in most cases, the only place where a young aristocrat could speak with a girl was at a ball during the Season. Crucially, the Season was interrupted by a major, unanticipated, exogenous shock: the death of Prince Albert. When Queen Victoria went into mourning, all royal dinners, balls, and luncheons were cancelled for three consecutive years (1861–63). I use this large shock — unrelated to the Season's main function — to identify the effects of the Season on marriage outcomes. In addition, I exploit changes in the size of the marriageable cohort as a source of identifying variation. This allows me to quantify the magnitude of the gains in matching efficiency created by the Season in the long-run (1851–75).

I find a clear, strong link between search costs and marital sorting. Using a combination of hand-collected and published sources on peerage marriages,[2] I find that in years when the Season effectively reduced search costs, the nobility's daughters sorted more in the marriage market: they were less likely to marry a commoner and were increasingly likely to marry husbands from families with similar landholdings. When the Season was disrupted, spouses came instead from geographically adjacent places, indicating that local marriage markets became a more important source of partners. There, markets were more shallow, reducing the strength of marital sorting.

Once the forces behind marital assortative matching are identified, I turn to examine the broader economic implications of sorting. I look at the effects of the Season — and its implied marriage patterns — on social mobility, inequality, and the provision of public education. A counterfactual analysis shows that if the Season had not existed, marriages between peers' daughters and commoners' sons would have been 30 percent higher in 1851–75. The institutional innovation of the Season, thus, helped the British elite erect an effective barrier that kept out newcomers (Stone and Stone 1984). Without the Season, England would

[1] Motto of the London Season at londonseason.net

[2] I use the Hollingsworth genealogical data on the peerage to describe the marriage behavior of the British elite. Hollingsworth (1957 and 1964) compiled evidence on marriage and social status for 26,000 peers and their offspring for the period 1566–1956. I complement this dataset with additional information from two published sources and from the archives (see data section).

have looked much more like continental countries, with large and not very rich aristocracies.

Because marriage is important for the intergenerational transmission of inequality, the Season also contributed to the extreme concentration of wealth in the hands of the British aristocracy. Compared to the nobility of many other countries, the British aristocracy not only "held the lion's share of land, wealth, and political power in the world's greatest empire" (Cannadine 1990),[3] its members towered over their continental cousins in terms of exclusivity, riches, and political influence. My results strongly suggest that a high degree of assortative matching contributed to this outcome. In a cross-section of English and Welsh counties, I find that where noble dynasties intermarried less with commoners over centuries, land was more unequally distributed. Economic inequality, in turn, can actually inflict a lot of harm on a country's long-term economic prospects (Persson and Tabellini 1994). In this paper, I discuss the effects of landownership concentration on public schooling (Sokoloff and Engerman 2000, Galor et al. 2009). Counties where land was more concentrated systematically under-invested in public education. With Forster's Education Act (1870), England recognized it was the role of the state to provide public education, which was to be subsidized mainly through property taxes (rates). This suggests that England and Wales fell behind in terms of educating the workforce because its entrenched landed elite, especially the anointed peers, was powerful enough to undermine the introduction of effective public schooling.

The Season provides a unique setting to study the determinants and the implications of marital sorting because it allows me to open the "black box" of the matching technology. Marriage markets today are typically informal. We can only guess who is on the market and who meets whom. In contrast, the matching process embedded in the London Season was explicit. Before the Season started, young ladies aged 18 were presented to the Queen at court. This formal act was a public announcement of who was on the marriage market. The *debutante* was then introduced into society at the balls and concerts organized during the Season. The purpose of these events was twofold: first, to allow for frequent encounters between suitors, and second to limit entry to "desirable" candidates. Guests were carefully selected by social status, and the high cost involved in participating even excluded aristocrats

[3] Around 1880, fewer than 5,000 landowners still owned more than 50 percent of all land (Cannadine 1990).

if they were pressed for money.[4] Overall, the matching process greatly reduced search frictions for the children of Britain's elite.

Several unique features of the historical setting allow me to identify the effects of the matching technology on marriage outcomes. The death of Prince Albert in 1861 was an exogenous disruption of the Season with strong effects on marriage outcomes. Figure 1 illustrates the consequences in one particular dimension: the rate of intermarriage between peers and commoners. The chart plots the number of people attending royal parties in the Seasons between 1859 and 1867 and the percentage of marriages outside the peerage. The latter is presented as a ratio of the rate for women older than 22 in 1861 relative to women below this cutoff age. I separate these two groups because one would not expect younger ladies to be severely affected by the interruption of the Season; they could simply delay their choice of husband until everything went back to normal. However, women aged 22 and over in 1861 could not wait long if they wanted to avoid being written off as a failure based on the social norms of the time.[5] Thus, they were forced to marry one of the first suitable suitors. Before Albert's death and after the Season resumed, women in both age groups were equally likely to marry a commoner. However, a great gap between the two opens after 1861. Those who had to marry when the Season was disrupted performed much worse in the marriage market. Their likelihood of marrying a commoner was 80 percent higher than that of the younger ladies who could wait for the Season to resume. This suggests that the Season was highly effective as a matching technology — by announcing who was on the market, creating multiple settings for the opposite sexes to meet, and segregating the rich and powerful from the poor and insignificant, it crucially determined who married whom.

[FIGURE 1 HERE]

My results contribute to the rich literatures on assortative matching and the importance of search costs. The study of marriage from an economic perspective dates back to the seminal works of Gale and Shapley (1962) and Becker (1973). These authors characterized the set

[4] The cost was driven by the need to host large parties in a stately London home; only those who issued invitations to balls, dinners, and luncheons could expect to receive them.

[5] According to these norms, if a lady was not engaged two or three Seasons after "coming out" into society, she was written off as a failure (Davidoff 1973: p. 52). Furthermore, in the early 1860s most ladies married when between the ages of 22 and 25. Since the older cohort would be 25 or more when the Season resumed in 1864, waiting was not an option for them.

of stable marriage assignments and derived the conditions for positive assortative matching. A classic insight from the assignment literature, however, is that once a search friction is introduced into the matching process, sorting is weakened or might even be lost. In other words, as the speed of encounters between singles increases, spouses will sort more in the marriage market (Collin and McNamara 1990, Burdett and Coles 1997, Eeckhout 1999, Bloch and Ryder 2000, Shimer and Smith 2000, Adachi 2003, Atakan 2006). In addition, Bloch and Ryder (2000) and Jacquet and Tan (2007) analyze endogenous market segmentation. They conclude that limiting people's choice set to those who are most similar reduces the congestion externality, which refers to the time an agent spends meeting people with whom she will never match. Since people then meet desirable partners at a higher speed, sorting increases.

Surprisingly, this well-accepted theoretical insight lacks clear-cut empirical support. Hitsch et al. (2010) estimate mate preferences from a dating website and then use the Gale-Shapley algorithm[6] to predict frictionless matches. Since the predicted matches are as selective as those achieved by the dating site, they conclude that "assortative mating [in dates] arises in the absence of search frictions" (p. 162). The simulated matches also broadly resemble actual marriage patterns, although sorting by education or ethnicity are somewhat underpredicted. This suggests that search frictions would, in fact, increase sorting. Hitsch et al.'s (2010) result, however, may be explained by the fact that the preferences of online dating users differ from the preferences of the population at large.[7] Lee (2008) obtains similar results in the context of a Korean match-making agency. Banerjee et al. (2009) estimate preferences for caste from marital advertisements in Indian newspapers. Their results suggest that search frictions play little role in explaining caste-endogamy on the arranged marriage market. Fisman et al. (2008) design a speed-dating experiment such that people of different ethnic groups meet at a high

[6]The Gale-Shapley algorithm (Gale and Shapley 1962) involves a number of stages. In the first stage, each boy proposes to his most preferred girl. Each girl then replies "maybe" to her favorite suitor and "no" to all others. In the second stage, boys who were rejected propose to their second choices. Each girl replies "maybe" to her favorite among the new proposers and the boy on her string, if any. She says "no" to all the others (again, perhaps including her provisional partner). The algorithm goes on until the last girl gets her proposal. Each girl is then required to accept the boy on her string. This algorithm guarantees that marriages are stable, that is, no pair of woman and man prefers each other over their current partners.

[7]Alternatively, the discrepancy between estimated frictionless matches and actual marriages may stem from methodological issues. First, the Gale-Shaply algorithm used to predict frictionless matches assumes nontransferable utility. This assumption appears appropriate to describe dating but not marriage, where explicit transfers play a large role nowadays. Furthermore, when estimating mate preferences, the authors rule out the possibility that there is noise in users' behavior. Once they take this into account, results suggest that preferences alone explain all marital sorting (Hitsch et al. 2010: pp. 160).

speed. The observed matches still display ethnic sorting, especially for women. This indicates that the low degree of interracial marriage in the Unites States stems not from segregation in the marriage market but from same-race preferences.

In addition to preferences and the matching technology, several studies have analyzed sex ratios as a potential determinant of sorting. Abramitzky et al. (2011) show that after World War I, French males married up[8] to a greater extent in regions where more men had died in the trenches. Angrist (2002) examines the effect of male-biased migration flows in the United States between 1910 and 1940 on various marriage and labor outcomes.

Another set of related papers uses implicit differences in marriage market depth between the city and the countryside as a source of identifying variation. Gautier et al. (2010) look at migration flows in and out the city and find that it is a more attractive place to live for singles because it offers more potential partners. Botticini and Siow (2011) compare the city and countryside marriage markets in the United States, China, and early renaissance Tuscany. They find no evidence of increasing returns to scale in the matching function. While these papers analyze whether an agglomeration makes matching more efficient, I consider a different matching technology. The Season not only pooled large numbers of eligible singles together, but it was also meant to facilitate their introduction and courtship. My findings suggest that this particular matching process displayed increasing returns to scale.[9]

This paper also sheds light on the relation between marital sorting, inequality, and economic growth. Although inequality is widely recognized as an important economic outcome, marital sorting has not received much attention as one of its potential determinants. Kremer (1997), Fernandez and Rogerson (2001), and Fernandez et al. (2005) establish a theoretical and empirical correlation between the degree to which spouses sort in the marriage market, economic inequality, and per capita incomes.[10] Therefore, any process that increases inequal-

[8]That is, they married spouses of higher socio-economic status.

[9]In particular, when royal parties were attended by less than 2,000 guests, the probability of marrying a spouse with similar landholdings increased by 0.25 percent for every additional 100 attendees. When the Season gathered more than 4,000 people, the same marginal effect jumps to 0.5 percentage points, and when royal parties reach 7,000 attendees, it increases to 1 percent.

[10]The idea is that greater inequality may reduce the rate of intermarriage between individuals of different socio-economic status, as the cost of "marrying down" increases. This increase in pickiness, in turn, raises the net return of being at the top of the distribution. In the presence of credit market frictions, only the offspring of richer couples adapt to the new circumstances, leading to inefficiently low aggregate levels of investment in human capital, higher wage inequality, and lower per capita incomes.

ity (e.g., skill-biased technological change) or reduces search costs for partners (e.g., Internet dating) could well lead to greater sorting and hence greater inequality. Because my paper considers a historical setting, I am able to analyze this relation in the very long-run. Understanding the long-run trend in inequality is important given the enormous concerns over this as a policy issue. Piketty and Saez (2006) use historical tax statistics to construct a long-run series for income and wealth concentration. For most Western democracies, they find a trend of increasing inequality over the last 25 years. High inequality, in turn, may have dramatic effects on important economic outcomes such as taxation (Persson and Tabellini 1994) or the provision of public education (Sokoloff and Engerman 2000), ultimately affecting the growth process.

My paper is not the first to analyze long-run trends in inequality and social mobility in Britain. Miles (1993, 1999), Mitch (1993), and Long and Ferrie (2013) analyze intergenerational occupational mobility in nineteenth century England. Clark (2010) and Clark and Cummins (2012) use rare surnames to gauge the rate of social mobility between 1200 and the present day. They conclude that England was a mobile society except at the very top of the distribution. My paper helps to explain the persistence of this elite.

The study of the London Season is also relevant because it adds to our understanding of the British nobility. This class, with all its opulence and ostentatious lifestyle, is usually regarded as a barrier to development. Doepke and Zilibotti (2008) argue that upper-class families relying on rental income cultivated a taste for leisure instead of hard work. According to the authors, the aristocratic devotion to leisure grew more sophisticated over time and was ultimately reflected in the London Season (p. 778). I argue that the Season was not only a notorious amenity but also an efficient institution for the British nobility, allowing them to remain in a privileged position for much longer than their continental counterparts. In line with this interpretation, Allen (2009 and 2012) notes that the British aristocracy ruled England from 1550 to 1880 and oversaw its metamorphosis from a small state to the richest country on earth, the first industrial nation, and the heart of the largest empire in human history. He suggests that the pomp associated with the aristocratic lifestyle was in fact a sunk investment and that social endogamy was aimed at maintaining the elite as a small, exclusive, and largely closed group. This allowed the nobility to ensure trustworthy service to the Crown at a time when uncertainty was high and trust was particularly important. The London Season can be interpreted both as a sunk investment in the marriage prospects of one's children and as a barrier against newcomers.[11]

Relative to the existing literature, I make the following contribution: First, this paper is one of the first to provide empirical evidence that search frictions affect marriage decisions. Second, I highlight the importance of endogenous segregation in marriage markets. My findings call for the incorporation of this element in the theoretical search literature applied to marriage. Third, my results suggest that over the very long-run, marital sorting may well lead to larger inequality, with broad effects on outcomes such as the provision of public schooling. Fourth, I shed light on how the marriage behavior of the British peerage shaped the class structure of Victorian Britain. This paper unveils one of the mechanisms that helped sustain the British nobility's role as an unusually small, exclusive, and rich elite.

The remainder of the paper is organized as follows. Section 2 depicts the London Season and the historical background. Section 3 describes the data sources. Section 4 presents the empirical analysis. First I show some descriptive statistics that pin down marriage outcomes in the golden days of the Season (1801–75). I then identify the effect of the Season on these marriage outcomes using exogenous variation in attendance to royal parties coming from changes in the size of the marriageable cohort. Finally, I establish a causal link between search frictions and sorting by analyzing the interruption of the Season during Queen Victoria's mourning (1861–63). Section 5 examines the robustness of the results. Section 6 discusses the role of preferences. Section 7 investigates the long-run economic implications. In detail, I examine the relation between sorting, inequality, and the provision of public schooling. Section 8 develops a simple two-sided search model to formalize the main results of the paper. Finally, section 9 concludes.

[11] Stone and Stone (1984), Spring and Spring (1985), and Wasson (1998) debate whether the English elite was open to newcomers. Their analysis is based on the rate of entry of newcomers into the elite. In my paper, I go one step beyond, looking not only at newcomers but also examining what the elite was actually doing to remain a closed group.

2 Historical Background: The London Season

In this section, I describe the institutional arrangements that, in combination, constituted the London Season. The London Season arose sometime in the seventeenth century. British peers typically resided in isolated manors on their countryside estates. From February to August, however, they moved to London to attend Parliament. Their whole family accompanied them to enjoy a more eventful lifestyle.

Why did such a Season not emerge in continental Europe?[12] Continental noblemen were not as rural as British peers. Also, most parliaments in the continent did not meet as regularly as in Britain, so continental aristocracy did not annually migrate to the capital. In addition, primogeniture and entailment allowed the peerage and gentry to remain small enough that these meetings in London were possible. Around 1900, only 1 in 3,200 people in Britain was an aristocrat. In comparison, the proportion in continental Europe was 1 in 100 (Beckett 1986: pp. 35-40).

The Season peaked between the 1800s and the 1870s (Ellenberger 1990). During that period, the London Season was a huge event that almost all of the British nobility and gentry attended. Figure 2 (Sheppard 1977) plots more than 4,000 movements into and out of London by members of the "fashionable world," as was reported in the *Morning Post* in 1841. At the beginning of the year, most people of fashion were out of town. The biggest influx came at the end of January when Parliament convened and anyone who was anyone in the elite moved from their country seats to London. This convergence gave rise to a brief pre-Easter season, marked by numerous dinners and soirées. On April 20, the Queen returned from Windsor, and the first debutante was presented at court, officially entering the marriage market. This marked the commencement of the main Season and was the most crowded time of year in London. Many social events designed to introduce bachelors to debutantes took place. For example, on May 15 — the day of the royal ball at Buckingham — more than 800 "fashionable" families were in London. After a gradual drift away from London, the Season was officially over by August 12, when the shooting season started and most peers moved back to their country estates. This seasonal migration was repeated annually.

[12] Although Paris and Vienna developed their own marriage markets, they never eclipsed the London Season.

[FIGURE 2 HERE]

What was the purpose of the Season? Although in 1841 seasonal migrations coincided with the Parliamentary calendar, cumulative inflows peaked between Easter and August, when most of the social events crucial to the "matching process" took place. In addition, Sheppard (1977) notes that families that were not prominent in politics, such as the earls of Verulam and Wilton, also showed the same migration pattern, indicating that the Season provided opportunities other than political lobbying.[13]

The unspoken purpose of these festivities was to bring together the right sort of people, thus "providing the setting for the largest marriage market in the world" (Aiello 2010). The Season became crucial in the nineteenth century, when

> arranged marriages were no longer acceptable so that individual choice must be carefully regulated to ensure exclusion of undesirable partners Under such a system it was vital that only potentially suitable people should mix. To meet these ends, balls and dances became the particular place for a girl to be introduced into Society. (Davidoff 1973: p. 49)

To restrict the pool of singles, most of the social events in the Season took place in private venues or in the homes of the elite, who carefully selected their guests based on status (Davidoff 1973). Public meeting places like Ranelagh or Hurlingham closed down, and the "fashionable world" put a stop to masked balls, easily gate-crashed by commoners (Ellenberger 1990: p. 636). The expenses required to participate in the Season also selected the most suitable candidates. Renting a house in Grosvenor Square or organizing a ball for hundreds of guests was extremely expensive. Earl Fitzwilliam devoted £3,000 in 1810 solely to entertaining guests. The Duke of Northumberland spent around £20,000 in the Season of 1840 (Sheppard 1971), at a time when a bricklayer could expect to earn 6 shillings (3/10 of a pound) for a 10-hour day (Porter 1998: p. 176). Very few could afford this standard of living. The arrangement also excluded impoverished peers who, after generations of gambling or mismanagement, were hard-pressed for money. Participating in the Season, thus, also signaled financial strength.

[13]One can presume that the Parliamentary motive actually played a secondary role. Parliament sessions were adjourned when the Derby took place. As *Harper's Monthly Magazine* stated once, "The Season depends on Parliament, and Parliament depends on sport" (May issue, 1886; quoted in Aiello 2010).

Within the best circles, the race to find a proper husband started with presentation at court and was followed by a whirl of social events. Lucy, daughter of the fourth Baron Lyttelton, kept a diary. She described June 11, 1859 as "a very memorable day" and a "moment of great happiness."[14] She was to be presented to Queen Victoria at court, officially coming out into society. In the following weeks, before returning to Hagley Hall, the family seat in Worcestershire, Lucy attended countless breakfasts, evening parties, concerts, and balls, where she danced with the most eligible bachelors. She even participated in a royal ball at Buckingham Palace, where she thought her heart "would crack with excitement!"[15]

Lucy's experience was not unique. Before the start of the Season, the most fortunate 18-year-old girls were presented to the Queen at St. James's Palace.[16] This event, considered the most important day in a woman's life, symbolized the change in status from childhood to adult life (Davidoff 1973). In practice, it was a public announcement of who was on the marriage market.

As reflected in Lucy's diary, after coming out young ladies began a stressful routine: balls, concerts, breakfast with guests, equestrian events, cricket matches, promenades, tea parties, opera, theater ... During the Season, it was usual for a young lady to start the day with a ride across Hyde Park at 10 am and end up at 3 am the following morning at a ball (Malheiro 1999). Lady Dorothy Nevill remembered than in her first Season she attended "50 balls, 60 parties, 30 dinners and 25 breakfasts" (Nevill 1920). This whirlwind of social events facilitated frequent encounters between singles. In particular, the Royal Academy Summer Exhibition was considered the first round for debutantes, and "ascot races were always the high point of the Season." They were described as "the Eden of debutantes and the milliners' harvest" (*Harper's Monthly Magazine*, 1886; quoted in Aiello 2010). Meetings at Almack's were popular, but royal parties were the most exclusive events, giving "a stamp of authority to the whole fabric of Society" (Davidoff 1973: p. 25). Many ladies met their future husbands at these balls, which have been described as "mating" rituals (Inwood 1998).

The pressure for these ladies to get married was enormous. They had only two to three

[14]The diary of Lady Frederick Cavendish, June 11, 1859.

[15]Diary, June 29, 1859.

[16]To be eligible, a young lady had to be sponsored by someone who had already been accepted in the royal circle, usually her mother.

Seasons to get engaged to a suitable partner. After that, they were written off as failures. If they "crossed the Rubicon" of 30 years, they became confirmed spinsters (Davidoff 1973: pp. 52, 54). The fate of Georgiana Longestaffe, a lady in her late 20s in Trollope's *The Way We Live Now*, illustrates how much a girl's marriage prospects deteriorated as years went by. Georgiana "had meant, when she first started on her career, to have a lord; but lords are scarce [...] She had long made up her mind that she could do without a lord, but that she must get a commoner of the proper sort [...] But now the men of the right sort never came near her" (Ch. 32).

Couples did not have much time to get to know each other. For example, decorum rules prevented a girl from dancing more than three times with one particular partner or sitting out a dance with a young bachelor (Davidoff 1973: p. 49). Unsurprisingly, marriages were not typically love matches but based on money or eligibility. Adultery was consequently commonplace. Oscar Wilde wrote, "I don't care about the London Season! It is too matrimonial. People are either hunting for husbands, or hiding from them."[17] Davidoff summarizes the materialistic view of marriage by the British aristocracy:

> Marriage was considered not so much an alliance between the sexes as an important social definition; serious for a man but imperative for a girl. It was part of her duty to enlarge her sphere of influence through marriage. (Davidoff 1973: p. 50)

The demise of the Season in the late nineteenth century is inextricably linked with the decline of the British nobility. The immense economic power of this aristocracy rested on a simple foundation: wealth in the form of land. According to Cannadine (1990), protection from foreign competition and light taxes made British agriculture very profitable from the 1840s to the 1870s. However, an agricultural downturn began in the 1870s. Estates that could once support their mortgages — and their proprietors' opulent lifestyles — fell into ruin. This was reflected in the Season. After the 1870s, many social events became public, and young ladies of commoner or colonial origins began to be presented at court (Ellenberger 1990). It was the death of the Season. Lady Nevill observed that "society, in the old sense of the term, may be said, I think, to have come to an end in the "eighties" of the [nineteenth] century." (Nevill 1910: p. 51). As Turner (1954) concludes, "love laughed at lineage" (p. 184).

[17] Oscar Wilde, *An Ideal Husband* (First Act).

3 Data sources

I use four data sources, two of which are newly computerized, and one of which is based on hand-collected archival documents. To describe the marriage behavior of the British elite, I use the Hollingsworth genealogical data on the British peerage (1964). I complement this dataset with family seats and landholdings from two published sources: Burke's *Heraldic Dictionary* (1826) and Bateman's *Great Landowners* (1883). Finally, to measure when the Season worked smoothly and when it was disrupted, I construct a new series of attendance at royal parties from the British National Archives.

3.1 Peerage records

The participants in the Season were the royals, peers, old landed gentry, and some successful commoners.[18] This well-defined group aroused curiosity, which eventually led to the publication of their family histories. Arthur Collins published the first peerage record in 1710. Since then, many genealogic studies have updated his work.[19] For the sake of illustration, Figure A1 in the appendix shows the entry for Charles George Lyttelton, brother of Lucy Lyttelton, from Cokayne's *Complete Peerage*.

Hollingsworth (1964) collected this genealogical material for his study of the British peerage. He tracked all peers who died between 1603 and 1938 (primary universe) and their offspring (secondary universe).[20] The data comprises approximately 26,000 individuals. Each entry provides information about spouses' vital events (date of birth, marriage, and death), social status, whether the husband was heir-apparent at age 15, and the status of the highest

[18]British society is divided into classes according to political influence. The head of the society is the Sovereign. The second strand is the peerage, represented in the House of the Lords. In sharp contrast with continental Europe, only the heir inherited the nobility status. This reduced the size of the nobility in Britain. Individuals who were neither peers nor royals were commoners. Again, the term differs from its meaning in Europe since the landed gentry (baronets and knights) belonged to this class.

[19]Three peerage records stand out: Burke's *Peerage and Baronetage*, Debrett's *The Peerage of the United Kingdom and Ireland*, and Cokayne's *Complete Peerage*. The genealogist John Burke wrote *Landed Gentry*, a similar record for knights and baronets. This last piece tends to be quite mythological, the result of centuries of word-of-mouth information. Oscar Wilde once said, "It is the best thing the English have done in fiction" (Burke's Family et al. 2005).

[20]The primary universe was defined from Cokayne's *Complete Peerage*. The universe of children was found from a variety of sources: Collins' *Peerage of England*, Lodge's *Peerage of Ireland*, Douglas' *Scots Peerage*, Burke's *Extinct Peerage* and modern peerage editions by Burke and Debrett. The remaining gaps were filled from a large list of sources, among which Burke's *Landed Gentry* stands out. See Hollingsworth (1964) for details.

ranked parent. Status is presented in five categories: (1) duke, earl, or marquis, (2) baron or viscount, (3) baronet, (4) knight, and (5) commoner. Moreover, the entries state whether a particular title belonged to the English, Scottish, or Irish peerage.

Note that the Hollingsworth dataset excludes the landed gentry, who also participated in the Season. The gentry and the peerage, however, did not always attend the same parties; the Season was not a uniform event but consisted of many "layers" (Wilkins 2010: p. 30). In this paper, thus, I focus on the layer for which marriage has the highest stakes — the peerage.

3.2 Family Seats

The Hollingsworth dataset is a valuable source of information about marriage and the social position of spouses. Unfortunately, no information regarding birthplace or residence is available. To resolve this, I exploit the fact that each titled family was required to build a seat in their estate and to live there for most of the year.[21] Family seats are recorded in heraldic dictionaries. These dictionaries are summarized peerage records that contain additional information at a family level: religious affiliation, motto, coat of arms, and family seats. The most relevant source for my purposes is Burke's *Heraldic Dictionary* (1826). Most of the young aristocrats who married between 1851 and 1875 were recorded as presumptive heirs in this source. Therefore, the family seats in Burke's dictionary correspond in general to the seats where the individuals under analysis grew up and lived most of the year.[22]

After going through each entry in Burke's *Heraldic Dictionary* (1826), I gathered information on 694 country seats for 498 families linked to the peerage. Then, I georeferenced these seats using GeoHack. Figure 3 illustrates their geographic distribution, indicating that the nobility was well dispersed all over the British Isles and that seats were quite isolated from each other.

[FIGURE 3 HERE]

Merging this information with the Hollingsworth dataset gives me 351 couples that mar-

[21] On the importance of seats for the British aristocracy, see Stone and Stone (1984). They use ownership of a large house as the criterion for belonging to the elite.

[22] Moreover, country seats were expensive to build and representative of long lasting lineages. Therefore, they generally remained in the hands of the same family generation-after-generation until the 1870s, when the aristocracy started its decline.

ryied between 1851 and 1875 for whom both seats are recorded.[23] For these individuals, I determine the distance between the spouses' seats using Vincenty's algorithm (Vincenty 1975). When one or both spouses have more than one seat — as was the case for Lord Cavendish — I take the minimum distance. Note that, by construction, distance is only defined when both spouses are peers or peers' offspring. Henceforth, I restrict the analysis of geographic endogamy to individuals who married within the peerage.

3.3 The Great Landowners

In Jane Austen's *Pride and Prejudice*, Mr. Darcy is described as a wealthy gentleman with an income exceeding £10,000 a year and proprietor of Pemberley, a large estate in Derbyshire. The wealth and estates owned by nonfictional aristocrats were also public knowledge thanks to Bateman's *The Great Landowners of Great Britain and Ireland* (1883). The book consists of a list of all owners of 3,000 acres and upwards by 1876, worth £3,000 a year. Also, 1,300 owners of 2,000 acres and upwards in England, Scotland, Ireland, and Wales are included. Each entry states acreage and gross annual rents. The book also reports the alma mater of the landowner, the clubs to which he belonged, whether he took his seat in Parliament, and other services he provided to the Queen. The years of birth, marriage, and succession are included when known. As an example, the entry for Charles George Lyttelton is shown in the appendix (Figure A2).

For the 558 men who appeared both in Bateman's *Great Landowners* (1883) and in the Hollingsworth dataset, I created a computerized database of all relevant information. Then, I assessed the family landholdings of their wives. Specifically, I included the landholdings of any of hers close relatives. Using this procedure, I matched 355 wives.[24]

[23]Specifically, I merge the entries in Burke's dictionary with the individuals in the Hollingsworth dataset, matching own title for males and parental title for women. When parental (own) title of a female (male) is not available, I try to match it using own (parental) title. Moreover, some entries in the Hollingsworth dataset are labeled with two titles, such as James Richard Stanhope, 7th Earl of Stanhope and 13th Earl of Chesterfield. Stanhope is recorded as having grown up in both the Chesterfield and the Stanhope country seats. With this methodology, all but four titles from Burke's *Heraldic Dictionary* are matched.

[24]Seventy-two percent of the matched wives are daughters and sisters of great landowners. Family estates and gross annual rents are similar across family relations. The exception is landowners' sisters, who belong to families holding larger estates. Table A1 in the appendix summarizes the acreage and gross annual rents of the matched wives by family relation.

3.4 Royal parties from Lord Chamberlain's records

Lord Chamberlain's department at the British National Archives provides data on balls, concerts, and all sorts of parties held at Buckingham or St. James's Palace during the London Season. Individuals invited to these events are listed in hierarchical order. Absentees are also listed or appear with their names crossed off. The period covered is from 1839 to 1902.[25] From Lord Chamberlain's handwritten invitation lists from 1851 to 1875, I recorded the number of invitations issued, the numbers attending and excused, the type of party, and the date of the event. In total, I recorded 121 parties.

Figure 4 plots the number of attendees at royal parties over time by type of event. The initial year, 1851, displays unusually high attendance rates, explained by the Crystal Palace Exhibition held in London that year. After that, there seems to be an increasing trend: in the early 1850s balls and concerts were attended by approximately 4,000–5,000 guests. In comparison, on June 24, 1874, a single royal ball brought together almost 2,000 people! The variety of parties also increased, including invitations for breakfast and afternoon parties. Crucially, this evidence reveals a huge disruption to the Season between 1861 and 1863. This was the result of Queen Victoria's mourning for the death of her husband, Prince Albert. In the empirical analysis, I use this large shock to identify the effects of the Season on marriage outcomes.

[FIGURE 4 HERE]

4 Empirical analysis

This section presents the empirical results. First I describe marriage outcomes in 1801–75, when the Season was at its peak. I then identify the extent to which these marriage patterns were shaped by the London Season. To do so, I use exogenous variation in attendance to royal parties coming from changes in the size of the marriageable cohort. Finally, I establish a causal link between search frictions and sorting by analyzing marriage behavior during the interruption of the Season after the death of Prince Albert (1861–63).

[25] The exact references are LC 6/31-55 for the period 1839-76, and LC 6/127-156 for 1877-1902. Additional lists are also provided in LC 6/157-164.

4.1 Data descriptives

From about 1800 to the 1870s, the Season was at its peak (Pullar 1998 and Ellenberger 1990), social parties were crowded, and presentation at court was considered the most important day in a girl's life (Davidoff 1973). What did marriage outcomes look like during the Season's golden years?

Table 1 shows marriage outcomes of all 2,570 peers and peers' sons marrying between 1801 and 1875. The row variable is the rank of the husband at age 15.[26] The column variable is the wife's social status, measured as the rank of her father. Each cell contains observed percentages at the top, expected percentages if the two variables were independent in italics, and the difference between the two below. For example, 39.3 percent of duke heirs who married during 1801–75, did so with the daughter of a duke. Under random matching, only 17.9 percent of them would have married such an eligible bride. The difference between the two, thus, is 21.4 percentage points.

The largest discrepancies are concentrated in two areas. First, peer heirs are much more likely to marry peers' daughters than under random matching. Second, commoners at age 15 and barons' sons who are on the lower tail of the social distribution only manage to marry girls of commoner origin. Overall, the relation between the husband and wife's rank is significant, as indicated by the chi-square test. The gamma test and Kendall's tau-b indicate that this relation is positive: husbands with a higher social position married the best-ranked spouses and vice versa. In other words, there was positive assortative matching in social status.

[TABLE 1 HERE]

Table 2 shows marriage outcomes from the perspective of peers' daughters. Between 1801 and 1875, dukes' daughters married significantly better than barons' daughters. Under random matching, the latter would have married duke heirs at a larger rate than they actually did. Again, the aggregate statistics confirm that there was positive assortative matching in terms of social class. This suggests that dukes, earls, and marquises looked down not only on

[26] Rank at age 15 allows me to proxy how these individuals appeared in the marriage market. This is particularly important for those individuals who were born commoners, remained commoners at the time of their marriage, but ended their lives holding a peerage — either by creation or by inheriting a distant relative's title. This individuals compose the "Commoners at 15" category.

commoners, but also on barons and viscounts.

[TABLE 2 HERE]

Discrimination also existed on the basis of family name, with peers from "old" families marrying much better. Table 3 shows that men whose families held land at the time of Henry VIII were 10 percentage points less likely to marry a commoner and 7 percentage points more likely to marry the daughter of a duke than men with a less distinguished pedigree.

[TABLE 3 HERE]

In nineteenth century Britain, social prestige was not restricted to heraldry. Estate property and gross annual rents from land were also important determinants of one's position in the social elite.[27] Table 4 shows marriage outcomes for peers in possession of 2,000 acres and upwards by the 1870s. I cross-tabulate their acreage against the landholdings of their wives' families. Acreage is divided into six classes following Bateman's categorization (Bateman 1883: p. 495). As in Table 1, each cell contains observed percentages, percentages under random matching in italics, and the difference between the two below.

The majority of great lords (64.5 percent) married spouses whose families were listed in Bateman's *Great Landowners* (1883). In addition, proprietors of smaller estates (less than 10,000 acres) were more likely to marry outside the circle of great landowners. The aggregate statistics suggest a strong pattern of positive assortative matching in terms of land: husbands in possession of larger estates married spouses from highly accomplished families, and vice versa. Table 5 presents the results in terms of rents from land. Again, marriages were not random; richer landowners were more likely to marry spouses from the most endowed families.

[TABLES 4 and 5 HERE]

Positive assortative matching in landholdings is not the result of an arbitrary definition of land classes. Figure A3 in the appendix shows the results of a kernel-weighted local polynomial

[27] Several great landowners listed in Bateman wrote letters to the author with outrage and demands for the immediate correction of the acres and rents assessed to them. Lord Overstone, for example, complained that "this list is so fearfully incorrect that it is impossible to correct it" (Bateman, p. 348). These complaints might seem unwise in the context of the 1870s, when a the rising public clamor about what was called the "monopoly of land", was encouraged by some members of the press. The complaints of the British nobility, therefore, cannot but subscribe their view of landholdings as a signal of social position.

regression of wife's landholdings on husband's landholdings. The advantage of using nonparametric regression is that these techniques allow the data to speak for itself. No assumptions are made about the functional form for the expected value of the wife's landholdings given husband's landholdings. Results suggest that both in terms of acreage (left panel) and in terms of land rents (right panel), wealthier individuals were more likely to marry spouses from well-accomplished families.

All together, this evidence suggests that the children of the nobility sorted in the marriage market on the basis of socio-economic status. Figure 5 illustrates the extent to which individuals bonded with similar others. The network diagram shows the connections between peers in possession of 2,000 acres and upwards marrying in 1862 and their spouses. Specifically, a man and a woman are linked if their fathers had the same social status or if the man and any woman's relative were in possession of similar amounts of land[28] or belonged to the same club. Except for Georgiana Marcia, all individuals were well connected; the fashionable world was a complex, dense network. The average man was connected to more than half of the women. However, the number of connections between spouses was on average higher than between men and women who did not marry (see Table A2 in the appendix for details). This suggests that people's choice set was somehow limited to those with whom they were most similar.

[FIGURE 5 HERE]

The Season, by pulling singles from all over the country, allowed individuals from very distant places to court. Table 6 shows that during the golden age of the Season very few spouses came from geographically adjacent places. Spouses' seats were separated by an average of 140 miles, which was a long distance at the time. Lucy Lyttelton described the journey from Hagley Hall to London (105 miles) as "most smutty," facing "wind, rain, and dirt on the box [of the open britschka]."[29] Further, when distance is broken down by class, I find that higher ranked individuals married spouses from more distant places. In comparison, 30 percent of commoners at age 15 — who were less likely to participate in the Season — married spouses in their same region.[30]

[28] To be precise, the link is established if they belonged to the same "Bateman class", as depicted in Table 4.
[29] Diary of Lady Cavendish, May 18, 1859.
[30] Regions are NUTS 1 for England, Scottish Parliament electoral regions, the four provinces of Ireland, and Wales.

[TABLE 6 HERE]

Were ladies pressured to marry quickly as suggested by the anecdotal evidence? Figure 6 shows that women's implied market value, measured as the rate of intermarriage with peers and duke heirs, decreased with age (Panel A). The same holds in terms of husbands' landholdings (Panel B). Specifically, the decline starts at age 22. Moreover, it seems that as a woman approached the "Rubicon" of 30 years, her attractiveness fell dramatically in the eyes of her suitors in the Season. Figure 6 further suggests that the depreciation of a woman's attractiveness crucially depended on her implicit "quality." For example, the devaluation for duke daughters was much steeper than that of baron daughters (Panel C).

[FIGURE 6 HERE]

Lucy Lyteltton's marriage mirrors the general marriage patterns in the golden days of the Season. In 1864, Lucy married Lord Frederick Cavendish. She was 22. He was the son of the Duke of Devonshire, one of the greatest landowners in Britain at the time. He was in possession of 198,572 acres scattered throughout his estates in Middlesex, Derbyshire, Yorkshire, and Ireland. His income was said to exceed £180,000 a year. To what extent was the Season responsible for such marriages? Interestingly, Lucy married after a bustling Season in which royal parties brought together approximately 5,000 people. Next, I use attendance rates to the London Season to identify its effects on marriage outcomes.

4.2 Variation in the size of the cohort

The number of attendees to the London Season is a good indicator of how smoothly the marriage market was functioning. As the Season got crowded, announcing who was on the market via court presentations became crucial. Also, a large influx into London implied more balls and concerts to be organized, allowing the children of the nobility to meet and interact more often and more quickly. Thus, the Season worked better the more heavily attended it was, and individuals marrying after largely attended Seasons had greater exposure to this matching technology. Their marriage behavior should therefore reveal the effects of the Season on marriage outcomes.

However, variation in attendance to the Season can be explained by many factors, some of which could be endogenous. It could be argued, for example, that whenever marriage outcomes got worse from the perspective of the nobility, more parties were organized in order to bring back social sorting. In addition the relation between the Season and intermarriage could be driven by underlying economic factors such as land prices. If economic conditions undermined the prosperity of the nobility and the royalty, they might have needed to marry wealthy commoners to alleviate debts.

To tackle these issues, I need a systematic source of exogenous variation in the number of attendees at royal parties. A suitable instrument for this purpose is the size of the female population of marriageable age. To measure it, I compute the number of peers' daughters between ages 18 and 24 each year from the Hollingsworth dataset. Eighteen was the earliest age at which a girl was presented at court. After 24, the hazard rate for women decreased sharply (see Figure A4 in the appendix).

The size of the cohort is a relevant instrument; whenever a boom cohort entered the marriage market, the number of people attending royal parties increased (see Figure A5 in the appendix). Importantly, variation in cohort size is truly exogenous, since no one plans how many children to have based on projections of marriage market conditions 20 years in the future. Finally, the instrument also satisfies the exclusion restriction, as it only affects marriage outcomes stemming from the London Season.

The size of the cohort does not vary much locally. Only when these changes are aggregated nationwide is the variation in cohort size meaningful.[31] Therefore, marriage behavior would not be affected by changes in the size of the cohort unless the British marriage market was centralized: the effect only goes through the Season. In addition, following Gautier et al. (2010) and Botticini and Siow (2011), I argue that decentralized marriage markets such as the ones set up in the countryside were not subject to increasing returns to scale. In other words, in these alternative markets, changes in the size of the cohort should not affect marriage behavior.[32]

[31] In 1851–75, the standard deviation of my cohort measure in 14.77. Great Britain and Ireland had 118 historical counties. A rough estimate gives an average yearly variation of only 0.125 individuals per county.

[32] One may argue that cohort size variation may affect sex ratios if rigid age preferences exist. Given that men tend to marry younger spouses, if the population is growing, the relative number of men in the marriage market decreases, producing a marriage squeeze (Bhrolchain 2001). To account for that, I include sex ratios

Formally, the number of attendees at royal parties in a given year, A_t, is treated as an endogenous variable and models as

$$A_t = \mathbf{Z}_t' \rho + \mathbf{V}_t' \eta + \nu_t \ , \tag{1}$$

where $\mathbf{Z}_t$ is a vector of instruments that includes the number of girls of marriageable age (18–24 years old at year t), a dummy for the 1851 Crystal Palace Exhibition, and an indicator for the interruption of the Season after the death of Prince Albert (1861–1863). $\mathbf{V}_t$ includes alternative predictors for attendance to royal parties such as the sex ratio or the existing railway network at the time. Trend and decade fixed effects are included to account for the time effects described in Figure 4.

The magnitude of the effect of the Season on the rate of intermarriage with commoners and on sorting by landholdings is captured by coefficient β in the probit model:

$$Pr\left(y_{i,t} = 1 | \hat{A}_t, \mathbf{V}_{i,t}, \mathbf{X}_{i,t}\right) = \Phi\left(\beta \ \hat{A}_t + \mathbf{V}_{i,t}' \lambda + \mathbf{X}_{i,t}' \delta\right) \ , \tag{2}$$

where $y_{i,t}$ indicates whether individual i married outside the peerage at year t in one regression and whether he married a spouse from his same land class in another regression. Land classes are defined in terms of acreage or land rents.[33] ϕ is the cumulative distribution function of the standard normal distribution. $\mathbf{V}_{i,t}$ is the aforementioned vector of time varying controls. $\mathbf{X}_{i,t}$ is a vector of individual controls, including class dummies, age at marriage, peerage of origin, and the relative size of class.[34]

Finally, to quantify the effects of the Season on a continuous measure of socio-economic homogamy and on geographic endogamy, I run

$$Y_{i,t} = \beta \ \hat{A}_t + \mathbf{V}_t' \lambda + \mathbf{X}_{i,t}' \delta + \epsilon_{i,t} \ , \tag{3}$$

as a control variable.

[33] In particular, land classes are defined in two ways: first, using Bateman's *Great Landowners* (1883: p.495) categorization. Second, using deciles.

[34] Here I use the relative number of individuals born within a six-year range (3 years before, 3 years after) belonging to the same class (dukes, earls, and marquises vs. barons and viscounts) to proxy for the relative size of the class. A specification using the relative number of peers aged 15–24 with respect to the total British population aged 15–24 yields similar results.

where $Y_{i,t}$ represents the distance between spouses' socio-economic "pizazz"[35] and the distance between family seats, respectively. When one or both spouses have more than one seat, I take the minimum distance. The set of controls is the same as in the previous regressions, except for the inclusion of the density of seats at the region level instead of the relative size of the class.

Note that I am using a triangular IV model in which both the treatment and the instrument only vary at the year level whereas marriage outcomes are measured at the individual level. To fit this model, I estimate the recursive equation system (1) - (3) by maximum likelihood. Specifically, I use the STATA user-written command cmp and cluster errors at the year level (Roodman 2007).

Panel B of Table 7 presents the first-stage results. I find a positive, significant relation between the size of the cohort and attendance at royal parties. A single additional woman of marriageable age attracts 67 people to royal parties. Moreover, both the Crystal Palace Exhibition and the mourning for Prince Albert significantly affected the number of attendees. In 1851, royal parties assembled about 3,000 more people than they would have if the exhibition had not taken place. In contrast, neither the sex ratio nor the length of the railway network, which proxies for the cost of commuting around Britain at the time, seems to play any role. Finally, the F-test is large enough to eliminate any concern about weak instruments.[36]

Panel A presents the probit and IV estimates for the effect of the Season on the rate of intermarriage with commoners. I find that the Season was a key determinant of sorting in this dimension. In particular, increasing the number of attendees by 5 percent (250 more people)[37] would decrease the probability of the average peer daughter marrying a commoner by 1 percent. For peer sons, the effect is slightly lower and not significant in the IV specification, perhaps because men could delay the age at marriage longer than women. Their marriage prospects thus might not have been so affected by annual variation in the number of participants in the Season.

The remaining control variables have expected signs. Consistent with the evidence from

[35] Socio-economic pizazz combines social status and landholdings in a single index. Section 4.2 defines this measure precisely.

[36] According to Staiger-Stock's rule of thumb (Staiger and Stock 1997), an F-test over 10 is sufficient to show that the instruments are not weak.

[37] Given that the average number of attendees to royal parties was 4,641.2, 250 guests are 5 percent.

Table 4, higher ranked individuals were less likely to marry commoners. For example, the probability of marrying outside the peerage was 24 percent higher for a baron's daughter than for a duke's daughter. The relative size of the class did not play any role, indicating that marriages were not randomly set. Older girls were less selective; for the average peer daughter, growing a year older increased the chances of marrying a commoner by 2 percent, reflecting the social pressure to get engaged shortly after coming out (Davidoff 1973: p. 52). The children of families in the Scottish or Irish peerage were more likely to marry commoners. Finally, imbalances in the sex ratio do not seem to play a relevant role in this context.

Overall, the model correctly predicts the probability of marrying a commoner in 70 percent of the cases.[38] The IV and probit marginal effects are very similar, indicating that the endogeneity bias might be small. Finally, the Sargan test for overidentifying restrictions implies that I cannot reject the exogeneity of the instruments.

[TABLE 7 HERE]

The Season not only affected the rate of intermarriage with commoners; it also helped to strengthen sorting in terms of landholdings. Table 8 reports the results from regressing the probability of marrying a spouse from the same land class on attendance to royal parties. Land classes are defined in two ways: using Bateman's categories (Bateman 1883: p. 495)[39] and in terms of deciles.[40] The sample comprises all peers and peers' sons in possession of 2,000 acres and upwards by the 1870s.

[TABLE 8 HERE]

Every 150 additional attendees at royal parties would increase by 1 percent the chances of a great lord marrying within the same "Bateman class" in terms of acreage. The effects are slightly smaller when acreage classes are defined in terms of deciles. Results also suggest that the Season had a meaningful, significant impact on sorting in terms of land rents. In this

[38]The remaining 30 percent might be explained by less observable factors, such as physical preferences or love.

[39]In other words, Table 8 reports the results from estimating equation (2) with $y_{i,t}$ indicating whether individual i married in the green diagonal in Tables 4 and 5.

[40]In particular, a marriage is in the land class if both spouses' landholdings are in the same decile or in a contiguous decile of the land distribution.

case, the effect is stronger when classes are defined in terms of deciles.[41]

I also find that compared to their English counterparts, Irish and Scottish great lords had more difficulty marrying a spouse in their same land class, no matter if defined with respect to acreage or rents. Being English increased a great lord's chances of marrying assortatively with respect to acreage by more than 10 percent. The length of the railway also seems to have played a role in this context. Every 100 additional miles in the railway network decreases land sorting by between 2 and 3 percent, indicating that an extensive railway infrastructure facilitated courtship outside the London Season. Also, railways reflected the power and riches of industrialists. As the railway network expanded, their daughters became more attractive in the marriage market despite their lack of landholdings.

Both models work well in assessing sorting in landholdings. Between 75 and 80 percent of the observations are correctly predicted. Again, probit and IV models produce similar results, and the Sargan tests cannot reject the exogeneity of the instruments.

Since probit regressions allow for nonlinear marginal effects, I can test whether the Season displayed increasing returns to scale. Figure 7 plots the number of attendees at royal parties against the marginal effect of 100 additional guests on sorting by acreage.[42] The larger the royal parties were, the greater the effect of bringing in additional guests on sorting by landholdings. This suggests that the matching technology embedded in the Season was subject to increasing returns to scale: as more people participated, the Season worked better. Singles met at a higher speed, and the children of the nobility had to wait a shorter amount of time before a proper proposal came. As a consequence, pickiness increased and marital sorting strengthened.

[FIGURE 7 HERE]

Tables 7 and 8 indicate that the Season had a large effect on sorting by social position and landholdings. To more precisely estimate these effects, I combine social status and landholdings in a single "pizazz" index. This index ranks men and women such that the heir to the dukedom of Breadalbane, the greatest landowner in the late 1870s, is at the top of the

[41] This might reflect the fact that Bateman's categorization of land rents was not as accurate as his categorization of acreage.

[42] For this graph, land classes are defined according to Bateman's categorization.

ranking, and a landless baron's second son is at the bottom. Specifically, the pizazz index orders individuals in a lexicographic manner: the first layer is defined by the percentile of the distribution of land rents. Within these categories, individuals are ranked according to the percentile of the distribution of acreage. Individuals in the same percentile of the distributions of land rents and acreage are ordered hierarchically by social position. For men, I consider status at age 15. Duke heirs are on the top, followed by baron heirs, duke sons, baron sons, baronets, and commoners at age 15 (i.e., who were "pure" commoners at this age, but ended their lives holding a peerage either by creation or by inheriting a distant relative's title). For women, duke daughters are followed by baron daughters and commoner daughters. To make male and female pizazz comparable, I categorize the resulting indices in percentiles. I construct this pizazz rank for all men and women marrying in 1851–75, as well as in five-year cohorts within this period. I then define homogamy as the squared difference between spouses' socio-economic pizazz.

In Table 9, I present the regressions of these homogamy indices on (instrumented) attendance to the Season. When socio-economic pizazz is defined over 1851–75, 100 additional attendees at royal parties would match individuals whose ranks are approximately 4.5 positions closer (square root of 20). In other words, a bride would be 4.5 percent closer to her "soul mate" in terms of socio-economic pizazz. The effect is slightly lower when the pizazz index is defined over five-year cohorts.

Compared to their younger brothers, duke heirs marry more homogamously. Landowners in possession of larger estates are also more likely to marry spouses' of similar pizazz. On the other hand, the effect is smaller and the sign is reversed for great lords earning larger rents from land.

[TABLE 9 HERE]

Finally, the pattern of geographic endogamy is also consistent with the centralization of the marriage market in London.[43] In Table 10 I show that a well-attended Season allowed

[43] Throughout the paper, I assume that the geographic origin of a partner does not enter the utility function. This assumption is justified by the fact that inheritance was restricted to males according to British nobility customs. Even when a couple did not produce a son, family estates were usually transferred to a distant cousin instead. Therefore, in the nineteenth century, marriage was not an option for estate consolidation, meaning choosing a partner from the immediate vicinity of the family's estate was not necessarily advantageous.

aristocratic singles from further away to meet, to court and eventually to marry. For every 100 additional attendees, the distance between spouses' seats increased by 1.25 miles.

In addition, duke heirs married spouses from more distant places. On average, their spouses came from 60 miles farther away than the mates of their younger brothers. On the other hand, the sons and daughters of Irish and Scottish peers married spouses from further away than their English counterparts. Neither age nor the density of seats seems to explain the geographic endogamy.

Results in Table 10 are not as strong as the ones obtained when sorting by social status and landholdings because the sample is smaller. The OLS coefficients for attendance to royal parties are not significant. Once attendance is instrumented, the magnitude of the coefficient increases, indicating that the endogeneity bias may be more important for geographic sorting.

[TABLE 10 HERE]

Altogether, these results indicate that the Season played a crucial role in determining who married whom. Following a "boom" cohort, the Season was well-attended, and the children of the nobility sorted more in the marriage market in terms of socio-economic status. Also, they married spouses from more distant places. One of the potential weaknesses of the cohort size instrument, however, is that it is not subject to much variation. The estimated effects, thus, might be underestimated. Next, I provide strong evidence suggesting that without the London Season, marriage behavior would have been dramatically different. To do so, I examine marriage outcomes during the three years when the Season was interrupted by a major, unanticipated, and exogenous shock: the death of Prince Albert.

4.3 Queen Victoria's mourning

On March 16, 1861, Queen Victoria's mother died. Victoria was grief-stricken, and her husband, Prince Albert, took over most of her duties despite being ill already (Hobhouse 1983). This was the start to a disastrous year that would end with Albert's unexpected death on December 14.[44] Victoria plunged into deep grief. She wore black for the rest of her life and

Consequently, when the Season worked better and pooled singles from all over the country, matched couples were, on average, likely to come from areas further apart.

[44]Prince Albert's death was unexpected. He was only 42 when he died. Alberts doctors diagnosed typhoid fever as the cause of his death. Only recently it has been discovered that Albert suffered a chronic disease and

avoided public appearances as much as she could. The London Season was no exception: from 1861 to 1863, most royal parties were cancelled. In addition, in 1862, the Queen suspended all court presentations (Ellenberger 1990). This long mourning was not always well understood by the nobility, who complained that "after the lamented death of the Prince Consort, the Queen came less and less to London, and the palace was more and more deserted, except at the intervals of the proverbial three days visit" (Ellis et al. 1904: p. 361).

The death of Prince Albert provides the perfect natural experiment to identify the effects of the Season on marital sorting. Noble children marrying in 1861–63 were essentially identical to those marrying in the years before and after the mourning period. Table 11 shows that among peers' daughters, age at first marriage, the proportion of duke daughters, and the origins of the peerage did not vary significantly across periods. In addition, the table suggests that Queen Victoria's mourning was the only disruption to the marriage market between 1861 and 1863. Neither the size of the cohort [45] nor the sex ratio[46] was distorted during this period.

The only difference between ladies marrying in 1861–63 and ladies marrying before and after is that the former could not fully benefit from the matching technology embedded in the Season: young ladies were not announced at court; poor and insignificant suitors were not fully screened out; singles from all over the country were not pooled in London; and because royal parties were cancelled, encounters became more costly. In other words, search frictions increased.[47]

[TABLE 11 HERE]

The interruption of the Season can thus be used to estimate the average treatment effect

that he had been ill for the last two years of his life (Hobhouse 1983: pp. 150-151). In addition, Albert took on important government duties until one month before his death. For example, on November 8, 1861, Union forces intercepted the British RMS Trent and removed two Confederate envoys, James Mason and John Slidell. The initial reaction of the British government was to demand an apology and the release of the prisoners. Meanwhile, Britain took steps to mobilize its military forces in Canada and the Atlantic. Albert intervened to soften the British diplomatic response, lowering the threat that a war would break out (Hobhouse 1983: pp. 154-155).

[45] The size of the cohort is measured as the number of girls aged 18–24. Eighteen was the earliest age at which a girl was presented at court. After 24, the hazard rate for women decreases sharply (see Figure A4 in the appendix).

[46] The sex ratio is the ratio of men aged 19–25 to women aged 18–24. The year lag accounts for the fact that men married later.

[47] The London Season was not restricted to royal parties and court presentations. Thus, it would be an exaggeration to state that during the mourning, the Season was fully shut down. However, these events were central, giving "a stamp of authority to the whole fabric of society" (Davidoff 1973: p. 25). While the Season might have taken place from 1861 to 1863, it must have worked poorly.

on the treated (ATT), that is, the effect of the London Season (treatment) on the marriage behavior of the children of the nobility (treated). Formally, I seek to estimate

$$ATT = E\left[y_{i,T=1}|T=1\right] - E\left[y_{i,T=0}|T=1\right] \ , \tag{4}$$

where $y_{i,t}$ is a marriage outcome, depending on (1) whether individual i married outside the peerage, (2) whether she married assortatively according to landholdings, or (3) the distance between spouses' seats. The mourning for Prince Albert gives me the appropriate counterfactual for $E\left[y_{i,T=0}\left|T=1\right.\right]$. Individuals marrying during the mourning, in general, would normally have participated in the Season but, for exogenous reasons, were less exposed to its matching technology. Thus, T indicates the treatment: $T=0$ if an individual married when the Season was disrupted (1861–63), and $T=1$ if she married when the Season worked smoothly.

Figure 8 summarizes the effect of Queen Victoria's mourning period on the rate of intermarriage between peers and commoners. The chart plots the number of attendees at royal parties between 1859 and 1867, along with the percentage of peers' daughters marrying commoners for two different age groups. The diamond line shows women who were under 22 in 1861. As I stressed in the introduction, one would not expect their marriage outcomes to be severely affected by the interruption of the Season, since they could just delay their choice of husband until everything went back to normal. This option, however, was not possible for women aged 22 or more in 1861. If they wanted to avoid being written off as failures according to social norms at the time (Davidoff 1973: p. 52), they had to marry soon. Figure A4 in the appendix shows marital hazard rates for the cohort marrying the decade before Prince Albert's death. Hazard rates peak at ages 22 and 25, sharply decreasing thereafter. Women aged 22 or more in 1861 would be 25 or more in 1864, when the Season resumed. Thus, these ladies were forced to marry during the mourning period.

Before Albert's death[48] and after the Season resumed, both women over 22 in 1861 and women below this cutoff seem to be equally likely to marry a commoner, controlling for age differences (that is, considering that at any point in time the latter were younger). However,

[48]The years before 1858 are excluded because women aged below 22 were only 17 or 18 years old by then and thus too young to marry.

a great gap between the two groups opens after 1861. In 1861, the differences are not stark, perhaps because at the time the Queen was mourning her mother and there was not the expectation that the Season would be disrupted for so long. However, after 1862, the older cohort performed much more poorly in the marriage market. In 1863, 80 percent of them married outside the peerage.[49] In contrast, younger ladies who could postpone their marriage plans raised their reservation match and only married if they secured a suitable husband. That explains the drop in their likelihood of marrying a commoner during the disruption.

[FIGURE 8 HERE]

Figure 9 confirms that younger ladies followed a deferred marriage strategy. On average, they married older; hazard rates are unusually high between ages 28 and 30. Also, their likelihood of marrying during the three years when the Season was interrupted was lower. The cumulative hazard rate during the mourning was around 24 percent for older women versus 18 percent for younger ladies.[50]

[FIGURE 9 HERE]

Women matched when the Season was interrupted also married markedly poorer spouses. Figure 10 plots, for all peers' daughters marrying in the peerage or the gentry between 1859 and 1867, the distribution of acreage of their husbands' families.[51] To ease the comparison of husbands' landholdings, the distribution of land is presented in percentiles. The dashed line represents the distribution for women who married in the years of the mourning; the solid line depicts the distribution for those marrying the years before and after. Women marrying during the mourning tended to wed a husband in the 30th percentile of the land distribution. In "normal" years, instead, the mode is in the 80th percentile. In other words, peers' daughters married better-endowed spouses when the Season was not disrupted.

[FIGURE 10 HERE]

[49] The marriage outcomes of these ladies resembled those of the 30-year-old spinsters in the golden days of the Season even though they were younger (see Figure 6).

[50] Specifically, I define older women as those aged 22 to 26 in 1861; younger women are aged 17 to 21 in 1861.

[51] Commoner husbands are excluded because land does not accurately proxy their wealth.

Sorting in landholdings was also distorted during Queen Victoria's mourning period. Figure 11 plots the distribution for the difference between husband and wife's acreage, in absolute value. Between 1861 and 1863 — when the Season did not take place, spouses' were more different in terms of landholdings, i.e., mismatch increased. Consider couples matched when the Season worked smoothly. In a matrimony on the 75th percentile of the mismatch distribution, one spouse held around 20,000 more acres than the other. Between 1861 and 1863 — without the Season, the difference between spouses' landholdings at the 75th percentile was around 35,000 acres. Similarly, in "normal" years the upper adjacent mismatch is of 30,000 acres. The corresponding value in the absence of the Season increases to 55,000 acres. On aggregate, the standard deviation of the difference between husband and wife's landholdings was 8,800 in "normal" years and 18,347 when the Season was interrupted. This evidence powerfully suggests that the Season — by reducing search frictions, induced the children of the nobility to sort more in the marriage market.

[FIGURE 11 HERE]

Women aged above and below 22 at the beginning of the interruption married similar husbands in terms of landholdings.[52] Thus, deferred marriage strategies seem to have worked well in preventing intermarriage with commoners but were not so effective at securing highly accomplished husbands. To understand this discrepancy, note that in the market there were plenty of earls and barons willing to propose to one of these younger ladies, even if they had to wait for the Season to resume. Instead it was very hard to eventually encounter the son of a great landowner, even in typical years. Thus, while the disruption of the Season might not have constrained the set of well-positioned grooms for younger ladies much, without this institution it became nearly impossible to meet a great lord.

The disruption of the Season is likely to have also affected geographic endogamy. By centralizing the marriage decisions in London, the Season allowed singles from all over the country to meet and to court. Does this pattern reverse during the mourning period? Do peers turn back to the area around their country seats to search for a spouse? Figure 10 suggests the answer is yes. The chart plots the number of attendees at royal parties each year

[52] A t-test comparing the mean acreage of husbands in the two groups yields nonsignificant results: the difference in means is 152 acres with a standard deviation of 6,438.

along with the average distance between spouses' family seats.[53] In 1862 and 1863, spouses came from much closer places than in years when the Season worked smoothly. For example, those marrying in 1859 came from seats separated by an average of 200 miles, but in 1863 the average distance between spouses' seats was only 100 miles.

[FIGURE 12 HERE]

The case study of Queen Victoria's mourning suggests that the Season was a highly effective "matching technology" — by announcing who was on the market, creating multiple settings for the opposite sexes to meet, and segregating the rich and powerful from the poor and insignificant, it reduced search costs for partners and strengthened the degree of marital sorting. In contrast, when the Season was interrupted after Prince Albert's death, local marriage markets became a more important marriage medium. These markets were more shallow, reducing the degree to which the children of the nobility could sort in the marriage market.

5 Robustness

In this section, I stratify my dataset by observables in order to identify the segments of the peerage for which the effects of the Season are more pronounced. I also examine the robustness of my results to using alternative measures of the London Season. I then show that the effect of Queen Victoria's mourning period on the rate of intermarriage between peers and commoners is robust to relaxing the 22-year-old threshold. In addition, I explore the validity of the cohort size instrument. First, I gauge the potential effect of unobserved variables in a raw correlation between the Season and marriage outcomes. Second, I assess the bias of the estimates in case the cohort size instrument is "plausibly" exogenous, i.e., it has some correlation with unobservables that are influencing marriage outcomes. Third, I inspect the robustness of my results to alternative definitions of the size of the marriageable cohort.

[53] The smaller sample size for the country seat data does not allow me to differentiate the younger and older ladies as in Figures 8 and 9.

5.1 Sample stratification

In Table 12, I compare the effects of the Season across different segments of the peerage, using the size of the cohort as a source of identifying variation. I subdivide individuals into heirs versus non-heirs, landowners in possession of acreage above versus below the median, great lords earning incomes from land above versus below the median, and individuals with socio-economic pizazz above versus below the median. I find stronger and more tightly identified effects for individuals of higher socio-economic position. When the Season was (exogenously) well attended, sorting by acreage increased more for peer heirs and for landowners in possession of larger estates. Homogamy, as defined in Table 9, is also more sensitive to the Season for individuals with more socio-economic pizazz. For regression on sorting by land rents, the coefficients for landowners above and below the mean are similar, although significance is lost for the former.

In contrast, the effect of the Season on geographic endogamy seems to come from individuals of lower status. Non-heirs, lesser landowners, and individuals with lower socio-economic pizazz marry spouses from further away when the Season works smoothly. Whereas in the baseline specification 100 additional attendees at royal parties increase the distance between spouses seats by 1.24 miles, the corresponding values for these subsamples are 3.48, 8.17, 7.46, and 2.56 miles, respectively. This suggests that although the London Season allowed heirs from highly accomplished families to marry better, their younger brothers were not reduced to staying at their country seats. They also participated in the string of social events embedded in the Season, and consequently, they courted and married ladies from all over Britain and Ireland.

[TABLE 12 HERE]

5.2 Alternative measures of the Season

Table 13 examines the robustness of my IV results to using alternative measures of the London Season. Column (1) reports the effects of the Season on marriage outcomes using the number of attendees at all royal parties. Alternatively, column (2) uses the number of attendees at balls and concerts, the quintessence of the Season. The reported marginal effects and standard errors do not vary much with respect to the baseline specification.

A potential weakness of my analysis is that noblemen who were hard-pressed to marry into well-positioned families could have also been more eager to attend the Season. If this happened more when the size of the marriageable cohort was larger, my baseline estimates would be biased. To account for this possibility, columns (3) and (4) use invitations issued to royal parties instead of the actual number of attendees. Again, marginal effects and standard errors are robust to this alternative measure of the Season. In years when Lord Chamberlain issued more invitations for royal parties, peer daughters were less likely to marry a commoner, great landowners married into families with similar landholdings, and spouses were more similar in terms of socio-economic pizazz. For geographic endogamy, the marginal effect of the Season vanishes when I restrict the number of invitations to royal balls and concerts.

[TABLE 13 HERE]

5.3 Queen Victoria's mourning and the 22-year-old threshold

In examining the effect of Queen Victoria's mourning period on peer-commoner intermarriage, I use the ratio of the rate of intermarriage for women older than 22 in 1861, relative to women below this cutoff age. I separate these two groups because one would not expect younger ladies to be severely affected by the interruption of the Season; they could simply delay their choice of husband until everything went back to normal. The threshold is set at at age 22 based on social norms at the time; if a young lady was not engaged to a suitable partner two or three Season after being presented at court, she was written off as a failure (Davidoff 1973). The most eligible girls "came out" between ages 18 and 19, so by age 22 they were already hard-pressed to marry. Further, around 1861 most ladies married at age 22–25. Since women aged 22 or more in 1861 would be 25 or more when the Season resumed in 1864, waiting was not an option for them (see Figure A4 in the appendix).

However, it could be that given the exceptional circumstances in 1861, the pressure to marry quickly was relaxed. Do my results depend on the choice of the age threshold? Figure 13 suggests the answer is no. The chart plots the number of people attending royal parties in the Seasons between 1859 and 1867, along with the percentage of marriages outside the peerage. The latter is presented as a ratio of the rate for older women relative to a younger cohort. Each panel considers a different age threshold: the baseline threshold at age 22, an earlier threshold at 21, and a later one at ages 23 and 24. Clearly, the effect of Queen Victoria's mourning does not vanish in any case. Even if the pressure to marry soon was loosened and ladies around 22 could afford to wait longer, the interruption of the Season had a meaningful impact on the rate of intermarriage of older ladies relative to their younger counterparts.

[FIGURE 13 HERE]

5.4 Assessing selection on unobservables

Queen Victoria's mourning was clearly an exogenous disruption to the Season. The exogeneity of the cohort size instrument, on the other hand, is not clear cut. Before examining the validity of this instrument, I first evaluate how much do we actually need it. The IV and raw marginal effects reported in Tables 7 to 9 are quite similar, suggesting that the endogeneity bias is in fact small. Only when it comes to geographical endogamy does the need for an instrument stand out.

Can raw regressions be used to identify the effects of the Season? One of the potential weaknesses of this strategy is the scarcity of control variables. To assess the potential effect of unobserved variables, I use the insight from Altonji et al. (2005) that selection on observables can be used to gauge the potential bias from unobservables. The strategy involves examining how much the coefficient of interest changes as control variables are added and then inferring how strong the effect of unobservables has to be to explain away the estimated effect. Formally, consider two individual regressions of the form $Y_{i,t} = \beta\ A_t + \mathbf{X}'_{i,t}\lambda + \mathbf{V}'_t\delta + \epsilon_{i,t}$. In one regression, $\mathbf{X}_{i,t}$ and $\mathbf{V}_t$ only include a subset of control variables. Call the coefficient of interest in this "restricted" regression β^R. In the other regression, covariates include the "full set" of controls. The corresponding coefficient is β^F. The ratio $\beta^F/(\beta^R - \beta^F)$ reflects how large the selection on unobservables needs to be (relative to observables) for results to become insignificant.

Table 14 presents the results. Of the 16 ratios reported,[54] none is less than one. The ratios range from 1.1 to 10.2, with a mean ratio higher than 3.0. For example, consider the baseline

[54] Ratios for the distance between spouses' seats are not reported because Table 10 already makes clear that the endogeneity bias is strong in this dimension.

specification and a restricted regression that only includes time effects and cohort controls.[55] The effect of unobservables would have to be 10 times larger than the effect of the covariates to explain away the impact of the Season on the probability of peers' daughters marrying commoners. For regressions on sorting in terms of acreage, land rents,[56] and homogamy, the ratios are 4, 7, and 3, respectively.

[TABLE 14 HERE]

5.5 Plausibly exogenous instrument

I assume that no one decides how many children to have by looking at marriage market conditions 20 years ahead and that local marriage markets are not likely to display increasing returns to scale (Botticini and Siow 2011). I therefore argue that the exclusion restriction in my specification is a good approximation, i.e., that the cohort size instrument is plausibly exogenous. The Sargan tests reported in Tables 7 to 10 cannot reject exogeneity of the set of instruments. The test is based on the assumption that at least one instrument is valid with certainty.[57] Since Queen Victoria's mourning period is arguably an exogenous, excludable shock to the Season, the Sargan test is very informative about the validity of the cohort size instrument.

However, one cannot fully rule out the possibility that changes in the size of the marriageable cohort are correlated with unobservables affecting marriage outcomes. In this subsection, I gauge the extent to which my results are sensitive to such hypothetical correlation. Formally, I rewrite equations (1)–(3) to estimate the system in a two-stage least-squares framework:

$$\begin{aligned} &\text{First stage} && A_t = \rho\ Cohort\ size_t + \mathbf{Z}_t' P_2 + \mathbf{V}_t'\eta + \mathbf{X}_{i,t}'\delta + \nu_t \\ &\text{Second stage} && y_{i,t} = \beta\ \hat{A}_t + \mathbf{V}_t'\lambda + \mathbf{X}_{i,t}'\delta + \gamma\ Cohort\ size_t + \epsilon_{i,t}\ , \end{aligned}$$

where $y_{i,t}$ is the marriage outcome: marrying outside the peerage, marrying assortatively with respect to acreage and land rents, homogamy, and distance between spouses' seats. $\mathbf{Z}_t$ includes dummies for the years of the mourning (1861–63) and the Crystal Palace Exhibition

[55] Time effects stand for a linear trend and decade fixed effects. Cohort controls are the sex ratio and the relative size of class — social class in column (1), land classes in columns (2) and (3), and both in column (4).

[56] Defined as marrying in your same "Bateman class" in terms of acreage, or marrying in the same decile or a contiguous decile of the land rents' distribution.

[57] Formally, the assumption is that as many instruments as endogenous regressors — one in my specification — are truly exogenous.

(1851). $\mathbf{V}_t$ and $\mathbf{X}_{i,t}$ include the set of covariates described in section 4.2. Note that for this robustness check, I consider a linear probability model for the dichotomous outcomes. Finally, γ is the direct effect of the size of the cohort on marriage outcomes — the effect that does not go through attendance to royal parties (ρ).

In this simple case, $\beta(\gamma) = \beta(\gamma = 0) + \dfrac{\gamma}{\rho}$, where $\dfrac{\gamma}{\rho}$ is the bias from violating the exclusion restriction. Table 15 reports the effects of the Season on marriage outcomes for different values of γ. It seems unlikely that the direct effect of the size of the cohort could be more than 75 percent of the direct effect of the number of attendees of the Season. Point estimates for the effect of the Season do not vary much when $\gamma < 0.5 \cdot \beta$ (when the direct effect of the cohort in less than half the direct effect of the Season). The estimated standard errors are also fairly stable across this range of γ values. The estimation bias is meaningful only under a large violation of the exclusion restriction — when the direct effect of the cohort is almost the same as the effect of the Season. Although these results do not allow me to make inference about my estimates, they suggest that for plausible small violations of the exclusion restriction, the cohort size instrument would still be valid.

[TABLE 15 HERE]

6 Discussion

In this section, I discuss the role of preferences as an important determinant of marital sorting. My results indicate that search frictions have a direct impact on marital sorting. In particular, although a preference to marry higher ranked individuals existed, when the matching technology embedded in the Season was distorted, sorting by socio-economic status was loosened. Does this mean that homophily — a preference for others who are like ourselves — did not play an active role in pairing? Was there any dimension of preferences driving sorting independent of the matching technology? In many settings, marital preferences are the sole determinant of sorting. For example, Hitsch et al. (2010) find that preferences alone explain all the observed sorting in online dating. Similarly, Banerjee et al. (2009) and Fisman et al. (2008) conclude that preferences are the main determinant of caste-endogamy in India and racial sorting in the United States.

I next turn to a specific dimension of preferences: political ideology. British peers were political animals. According to Douglas Allen,

> It is hard to exaggerate the extent to which the aristocracy ruled Britain through its control over what we now call public offices. Both houses of Parliament were controlled by them until the turn of the twentieth century. The King's household, which evolved into the executive arm of the government, was the domain of the aristocracy, as were the great offices and tenures of state. (Allen 2009: p. 301)

Political ideology was not limited to the House of the Lords. It was also reflected in social life. Most peers belonged to political clubs: Brook's, Reform, and Devonshire were liberal clubs, and Carlton, Jr. Carlton, Conservative, and St. Stephen's were tory clubs (Bateman 1883: p. 497).

Club membership mattered for marriage. Table 16 cross-tabulates the political ideology of spouses who married before the decline of the Season in the 1870s (Ellenberger 1990). To measure the political preferences of husbands, I use the ideology of the clubs they belonged to. For wives, I use the clubs in which any close relative was a member. Each cell shows the observed percentage of marriages in each category, the expected percentage if marriages were randomly set, and the difference between the two below. I find that 39.5 percent of liberal husbands married liberal wives, but under a random assignment, only 29.5 percent of them would marry women with the same ideology. For tory husbands, the difference between observed and randomized percentages is 4.3 points. Aggregate statistics confirm that husband and wife ideology are related variables. In most cases, fathers and sons-in-law shared the same political views.[58]

[TABLE 16 HERE]

In contrast to sorting by socio-economic status, sorting by political ideology is not explained by the London Season. Figure 14 shows that political endogamy was stable over time. It was independent of the number of attendees to royal parties, and it was not affected by the interruption of the Season during Queen Victoria's mourning.

[58] Of course, within the groups of tories and liberals there is plenty of heterogeneity that escapes this simple dichotomous definition of political ideology. A more precise analysis, left for future research, would be to use the voting patterns of these individuals on the Reform Act of 1867 to more precisely identify their political preferences.

[FIGURE 14 HERE]

This evidence suggests that sorting by political ideology was mainly driven by preferences, independent of the matching technology. Why does sorting by social status and sorting by ideology behave differently? The reason is that there were very few duke heirs in the marriage market relative to individuals with the same ideology. When the matching technology did not work smoothly, young ladies had more difficulty meeting well-positioned grooms. As a consequence, sorting in this dimension was affected. In contrast, even when the Season was disrupted, it was relatively easy to meet a like-minded partner. Thus, regardless of the matching technology, political endogamy remained stable.

This finding is in line with Banerjee et al. (2009). They estimate the equilibrium price of caste in the Indian arranged marriage market. Though individuals seem to be willing to disregard beauty and education to marry within their caste, they do not have to do so in equilibrium because the market is sufficiently deep, meaning there is a high probability of eventually encountering someone within your caste who is highly educated and/or handsome. This implies that caste is not a significant constraint on marriage. Likewise, since the marriage market for the British upper classes was crowded with liberals and tories, a debutante looking for a like-minded groom was not constrained by disruptions to the Season.

7 Economic implications in the long-run

This section examines the implications of marital assortative matching for social mobility and economic inequality. Next, I discuss how inequality affected the provision of public schooling in England.

7.1 Sorting and inequality

Over the last 50 years, marital sorting (Costa and Kahn 2000) and inequality (Piketty and Saez 2006) have increased hand-in-hand in the United States. Given the enormous concerns over inequality as a policy issue (Persson and Tabellini 1994), understanding this relation becomes crucial. Fernandez et al. (2005) show both theoretically and empirically that sorting and inequality potentially reinforce one another. However, modern-day data can hardly speak to the long-run consequences of marital assortative matching. Because this paper deals with a historical setting, I can shed light on this issue. Next, I gauge the effects of the Season — and its implied sorting patterns — on social and economic inequality.

Using the estimated coefficients in Table 7, I predict how marriage patterns would have looked in the absence of the Season — that is, I set the number of attendees to zero.[59] Figure 15 compares observed and counterfactual marriage outcomes. Between 1851 and 1875, the rate of intermarriage between peers' daughters and commoners would have been 30 percent higher without this institution. Given that the observed rate of intermarriage was already around 60 percent, it could be said that almost all the marital segregation between peers and commoners can be explained by the London Season. In other words, many newcomers would have married into the nobility without the Season; England would have looked much more like continental countries with large and not very rich aristocracies.

[FIGURE 15 HERE]

In addition, in a cross-section of English and Welsh counties, I document a strong and significant correlation between sorting and inequality over the very long-run. In particular, I focus my attention on inequality in regard to the distribution of land. To do so, I assign each noble family to the county in which their principal estates were located. Then I compute the dynastic intermarriage rate: the percentage of members of a dynasty[60] that first married a commoner, from the origins of the dynasty to the 1870s. Figure 16 plots this rate of dynastic intermarriage against the Gini index for the distribution of land (computed from Bateman 1883). I find that in counties where noble dynasties intermarried less with commoners over time, land was more unequally distributed by the late nineteenth century (Panel A). The correlation is even stronger when I only consider dynastic intermarriage during the nineteenth century, when the Season was at its peak (Panel B).

[FIGURE 16 HERE]

[59] To calculate the counterfactual number of marriages outside the peerage, I assume the number of marriages per year to be fixed.

[60] Heirs are excluded from this calculation to avoid the endogeneity that may arise if they married strategically to consolidate their estates. This practice was common in the late seventeenth century (Mingay 1963).

This evidence does not allow for causal inference. However, given the importance of marriage for the intergenerational transmission of wealth, the mechanism behind this correlation seems obvious. By segregating the rich and powerful from the poor and insignificant, the Season prevented wealth from trickling down. To illustrate this point, consider the following example. Society is divided into two groups. In the initial period, members of the first group possess all the wealth in the economy. Wealth is fixed and bequeathed from generation to generation. In this simple case, the only way in which society will become more equitable is if at some point individuals from the two classes intermarry. Any institution that prevents this from happening will perpetuate inequality.[61]

In Britain, this trickle-down mechanism was not fully eliminated by the custom of primogeniture. Although male heirs received all the land, their younger brothers and sisters were not completely excluded from inheritance. On the day of their marriage, heirs typically signed a marriage settlement, agreeing to provide for their younger brothers and sisters (Habakkuk 1940). They were to receive an annual "salary" from the family estate. Therefore, the larger the rate of intermarriage between these rentiers and commoners, the more wealth would trickle down. This might have had important consequences over the distribution of land, especially in the eighteenth century. At that time, the land market was as active as ever. However, credit constraints on smaller landowners generated "a drift in property ... in favor of the large estate and the great lord" (Habakkuk 1940: pp. 2, 4). These constraints might have been relaxed if noble dynasties had intermarried more with commoners.

Although I am focusing on landed property, other forms of wealth became important, especially after the Industrial Revolution. Great lords may have been able to maintain their economic status by allowing wealthy commoners in, but Figure 16 shows that they did not. This means that in addition to economic inequality, the British aristocracy was also protecting social structure. Clark (2010) and Clark and Cummins (2012) document high aggregate levels of social mobility between 1200–2009 in England. However, they also note that some families remained at the top of the income distribution for more than 30 generations. "Their success

[61] In this simple example, I assume that wealth can be accumulated but that there is no technology generating new wealth. While this assumption might be good for the case of landed property, it is by no means reasonable for other forms of wealth. If wealth can be generated, society may become more equitable (even under perfect segregation) if poorer individuals generate wealth at a higher rate. In Britain, the Industrial Revolution might have played this role.

over 900 years implies that at least at the very top of traditional English society there must be some limitation on regression to the mean" (p. 28). The London Season might well account for this limitation, helping to sustain the English nobility's role as an unusually small and exclusive elite.

7.2 Implications on the provision of public schooling

Was inequality harmful to Britain? Despite being the cradle of the Industrial Revolution, the provision of education in England lagged behind Prussia and the United States, nations that eventually became the world's industrial leaders (McCloskey and Sandberg 1971). Contemporaries were well aware of this. In 1850, Joseph Kay, a Victorian educationalist, returned from his European tour puzzled by the apparent contradiction that in England, "where the aristocracy is richer and more powerful than that of any other country in the world, the poor are ... very much worse educated than the poor of any other [western] European country."[62]

Sokoloff and Engerman (2000) and Galor et al. (2009) famously suggest that landownership concentration might slow the implementation of public schooling. The idea is that while emerging capitalists might be willing to support and subsidize education because they are eager for an educated workforce, entrenched landowners oppose educational reforms due to the lack of complementarity between human capital and agrarian work, and to reduce the mobility of the rural labor force (Galor and Moav 2006). Where entrenched landowners are more powerful (i.e., landownership is concentrated in their hands), the provision of public schooling is delayed.

This explanation seems particularly suited to explaining England's delay in introducing public education. Its aristocracy held the lion's share of land, wealth, and political power for most of the nineteenth century (Cannadine 1990). Goñi (2013) examines these issues further exploiting evidence from School Boards. School Boards were introduced in England and Wales in 1870 after Forster's Education Act. In response to a growing concern about Britain's loss of industrial leadership, the Act recognized for the first time that it was the role of the state to provide elementary education (Stephens 1998). In particular, School Boards were created in the districts and boroughs where little education was available. Each Board could (1) raise

[62] Quoted in Stone 1969: p. 129

funds from a rate, (2) build and run public schools[63] if existing Voluntary schools, which were run by the church, were scarce, (3) subsidize these Voluntary schools, (4) pay the fees of the poorest children, and (5) create by-laws making attendance compulsory. School Boards had the power to decide how much money to collect and how to spend it. This made them a good target for the local landed elites unwilling to subsidize the provision of public education (Stephens 1998). Were these elites successful in taking over School Boards?

Figure 17 suggests that, in fact, landownership concentration had a negative impact on the provision of public education. The chart shows the kernel density function of investment in education between 1870 and 1895 in pence per capita. The distributions are plotted for two different sets of counties: counties where land concentration was large versus counties where it was not (i.e., above vs. below the median). Land concentration is measured as the share of a county in the hands of landowners in possession of 3,000 acres or more. Clearly, the estimated distributions are different. Between 1870 and 1895, School Boards in counties with low levels of land concentration raised more funds for public education. The distribution is concentrated at 80 pence per capita. Where landownership was more concentrated, investment in education ranged between 0 and 40 pence per capita.[64]

[FIGURE 17 HERE]

Altogether, this suggests that England and Wales fell behind in terms of educating the workforce because its aristocratic landed elite, after generations of marriage endogamy, accumulated the lion's share of land. This gave them sufficient economic power and influence to oppose subsidizing the provision of public education with taxes on their properties.

8 The Model

This section presents a two-sided search model that formalizes the search and matching problem of the British upper classes during the London Season. The main objectives of the model

[63]These schools were commonly known as Board schools. To be precise, Public schools were fee-charging exclusive secondary schools with Eton, Rugby, or Harrow being the most well-known. Henceforth, for ease of exposition, I will refer to Board schools as public schools.

[64]Figure 17 is extracted from Goñi (2013). Evidence on investment in public schooling is from the reports of the Committee of Council on Education. They contain information on funds raised from rates and other sources of School Board incomes, as well as its expenditures, and various educational outcomes beyond literacy or enrollment rates.

are to highlight the central role played by search frictions in assignment theory and to provide theoretical foundations underlying the results I obtain in this paper. The model also incorporates nonstandard features like endogenous market segmentation and discusses their implications on marital sorting.

8.1 The standard two-sided search model

The market is populated with a continuum of ex-ante heterogeneous men and women who wish to form long-term partnerships. Agents are characterized by their socio-economic status: x for men and y for women. Let x and y be distributed according to $F(x)$ and $G(y)$ over $[0, 1]$. The corresponding density functions are $f(x)$ and $g(y)$. All agents agree on how to rank one another. When a type x man matches with a type y woman, the former receives utility y and the latter receives utility x. Formally, $u_x(y) = y$ for all $x \in [0, 1]$, and $u_y(x) = x$ for all $y \in [0, 1]$. Therefore, I follow Collin and McNamara (1990), Smith (1995), Bloch and Ryder (2000), Burdett and Coles (1997), and Eeckhout (1999) and assume utility to be nontransferable.[65]

Time is discrete. All men and women start their lives as singles, a state that yields no payoff. Because of search frictions, it takes time for agents to meet. The rate at which contacts are made is determined by a matching function. Given the measures of men (λ^m) and women (λ^w), the number of encounters is given by $\alpha M(\lambda^m, \lambda^w)$, where α is the efficiency of the matching function and M is increasing in both its arguments. I define $\mu_w(\lambda^m, \lambda^w, \alpha) = \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w}$ as the encounter rate for single women (analogous for single men).

When two singles meet, they decide whether to propose or not. A match is formed when both propose to each other. These agents then leave the pool of singles but are automatically replaced by two clones. This guarantees that the distributions G and F are time invariant.[66]

Although being single is undesirable, it does not necessarily mean that an agent will

[65] Edward Cave's *Gentleman's Magazine* (1731–1922) published a monthly column of marriages, which gave the amount of dowry, sometimes invented, and any gossip that could capture the reader's attention (Cannon 1984: p. 73). However, the dowries of noble marriages were never published, and from 1775 onwards, not even the dowries of commoners were published, suggesting that the practice was not that widespread at the eve of the nineteenth century. Moreover, the assumption of nontransferability is justified as long as rank and land actually reflected social prestige, which is not as transferable as wealth.

[66] In the context of the Season, this assumption is justified by the fact that when the daughter of a noblemen gets married, her younger sister replaces her by coming out in the Season.

match with the first person he/she meets. It might be wise to wait until a proper proposal comes. The discounted lifetime utility of single women thus depends on the probability of eventually encountering "acceptable" agents. Patience is determined by a discount factor $\beta > 0$. Formally,

$$(1-\beta)V(y) = \beta \ \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w} \ \Omega(y) \int_0^1 max \left\langle W(x,y) - V(y), 0 \right\rangle dF(x|y) \ , \tag{8.1.1}$$

where Ω stands for the proportion of males who propose to her; $F(x|y)$ is the distribution of their socio-economic status; and $W(x,y) = x + \beta W(x,y)$ is the value function for a woman of type y married to a man of type x.

Singles follow utility-maximizing strategies when deciding which offers to accept. Formally, the optimal strategy for a woman y is to set a reservation match threshold $r(y)$ such that all proposers yielding a utility above it are accepted. This threshold $r(y)$ is set such that marrying the reservation candidate yields a utility level equal to the value of search: $W(r(y), y) = V(y)$.

Of course, this reservation strategy depends on the behavior of the other singles. Consider the problem faced by the woman with the highest socio-economic status ($y = 1$). Note that all men will propose to her, so $\Omega(1) = 1$ and $F(x|1) = F(x) \ \forall x$. Hence, I can rewrite (6.1.1) for this woman as

$$(1-\beta)V(1) = \beta \ \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w} \ \int_0^1 max \left\langle W(x,1) - V(1), 0 \right\rangle dF(x) \ .$$

Plugging $W(x,y) = x + \beta W(x,y)$ into this equation, I find that the optimal reservation match for the most attractive woman is

$$r(1) = \frac{\beta}{1-\beta} \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w} \int_{r(1)}^1 [x - r(1)] f(x) dx \ . \tag{8.1.2}$$

The reservation strategy for the most attractive man, $\rho(1)$, is derived analogously. Note that as the most attractive man is willing to propose to all woman with $y \geq \rho(1)$, they will be desired by all men as if they were the most charming woman themselves. Therefore, they will be equally selective and use the reservation strategy of the most attractive woman. Similarly, all men with $x \geq r(1)$ will use the same strategy as the most attractive man.

So, $[r(1), 1] \times [\rho(1), 1]$ constitutes the first marriage class, which behaves in an endogamic way. Agents in this class only marry members of the same class. I rewrite $a^1 \equiv r(1)$ as the reservation strategies of class 1 women ($b^1 \equiv \rho(1)$ for class 1 men).

Consider now the worthiest woman not belonging to class 1. The problem she faces has the same structure as before, with all men not in class 1 willing to marry her. Therefore, a second endogamic marriage class $[a^2, a^1) \times [b^2, b^1)$ will be formed. We could extend this argument and find a marriage equilibrium in which agents maximize their utilities given their beliefs. This is summarized in the following proposition from Burdett and Coles (1997):

Proposition 1 *(Class Partition Equilibrium.) The marriage equilibrium consists of a sequence of reservation strategies,* $\{a^n\}_{n=0}^{N^w}$ *for women and* $\{b^n\}_{n=0}^{N^m}$ *such that*

- $a^0 = b^0 = 1$
- $a^n = \frac{\beta}{1-\beta} \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w} \int_{a^n}^{a^{n-1}} [x - a^n] f(x) dx$; and
  $b^n = \frac{\beta}{1-\beta} \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^m} \int_{b^n}^{b^{n-1}} [x - b^n] g(x) dx$
- $a^n, \ b^n \ > 0 \ \forall n$
- *Men in class n* $x \in [a^n, a^{n-1}]$ *only marry women in class n* $y \in [b^n, b^{n-1}]$

See the appendix for the formal proof, which follows the intuition described above.

Under this simple preference specification in which one's type affects her payoff only through whom she can match with, positive assortative matching arises naturally.[67] The highest ranked men and women form endogamic marriage classes, while individuals in the lower tail of the socio-economic distribution, although preferring to marry top partners, are "forced" together.

Note that the degree of sorting will be stronger in equilibria with a larger number of smaller classes. To illustrate this, consider two extreme cases. If there is only one marriage class, all agents marry the first person they meet. Marriages are randomly set, so the characteristics of your spouse are completely independent of your own. That is, there is no sorting at all.

[67] The fact that I ruled out narcissism, that is, that agents enjoy their own socio-economic attractiveness, is not necessary for the results. A utility specification in which single men enjoy their socio-economic status x and married agents enjoy the sum of the souses' types $u_x(x, y) = x + y$ would yield the same results (Burdett and Coles 1999). Other utility specifications in which agents' attractiveness interacts $u_x(x, y) = f_1(x) \cdot f_2(y)$ guarantee positive assortative matching as long as they are log supermodular (Shimer and Smith 2000). However, they do not display the partition equilibrium (Burdett and Coles 1997) that will be used here unless preferences are multiplicatively separable (Eeckhout 1999).

Instead, consider an equilibrium in which people only marry those who look exactly like themselves. In this case, there are an infinite number of "singleton" marriage classes, leading to perfect positive assortative matching.

Definition 1 *(Sorting) A marriage equilibrium* $\{a^n\}_{n=0}^{N^w}$, $\{b^n\}_{n=0}^{N^m}$ *displays a larger degree of sorting than an equilibrium* $\{\hat{a}^n\}_{n=0}^{\hat{N}^w}$, $\{\hat{b}^n\}_{n=0}^{\hat{N}^m}$ *if* $a^n \geq \hat{a}^n$ *and* $b^n \geq \hat{b}^n$ *for all* n, *holding with inequality for some* n, *and* $N^i \geq \hat{N}^i$ *for* $i = m, w$.

In the following subsections, I explore how the equilibrium degree of sorting depends on two features of the London Season: the efficiency and the increasing returns to scale of the matching technology, and the segregation of poor and insignificant suitors.

8.2 The matching technology

The London Season not only pulled noble singles together, it also facilitated their courtship. When working smoothly, the Season created multiple settings for the opposite sexes to meet and court. In a single night, each girl could dance with dozens of eligible suitors. Local marriage markets, in comparison, were more shallow. To meet as many suitors as in the Season, one would have to travel all over Britain and Ireland, visiting each suitors' family seat. The matching technology embedded in the Season, thus, can be characterized as highly efficient, i.e., as having large α.

Furthermore, the fact that noble families from all over the country moved to London to get their offspring married hints at the existence of some sort of increasing returns to scale. In Seasons in which a lot of girls came out to the marriage market, public information was crucial. Presentations at court helped to centralize information and coordinate the nobility. Also, as the Season got crowded, more balls and concerts were organized, allowing the children of the nobility to encounter one another even more quickly. Hence, I model the encounter function in the Season as having increasing returns to scale, i.e., $\frac{\partial M(\lambda^m,\lambda^w)/\lambda^i}{\partial \lambda^i} > 0$ for $i = m, w$.[68]

[68] The clone replacement assumption (i.e., the fact that matched agents are automatically replaced by two clones in the pool of singles) is crucial in order to avoid multiple equilibria once I introduce increasing returns to scale. Although this assumption is well-suited for the London Season (see footnote 63) it may not apply to other settings. Therefore, the comparative statics with respect to the mass of participants should be taken with caution.

How would this matching technology affect marital sorting? The main trade-off that agents face in this model is between marrying sooner to enjoy marriage flow utility and waiting to get a proper match. The value of waiting depends on the rate at which you meet proper types. Thus, when the Season worked smoothly (i.e., the matching technology was efficient) and was largely attended (i.e., increasing returns to scale), the speed of encounters between singles increased. As a consequence, singles were more likely to wait, rejecting more offers and forming a larger number of smaller classes in equilibrium. In other words, sorting increased. This leads to Proposition 2.

Proposition 2 *As the matching technology becomes more efficient (larger α) and as the measure of men and women increases (larger λ^m, λ^w), the degree of sorting in equilibrium increases.*

The appendix provides a formal proof based on Bloch and Ryder (2000).

Figure 18 gives an example of how the class equilibrium changes as the matching technology becomes more efficient and as participation rates increase. The model is calibrated for the case of symmetric populations ($\lambda^m = \lambda^w = 1$ and $F(x) = G(x)$ $\forall x \in [0, 1]$) with uniform distributions and a discount rate of $\beta = 0.8$. The matching technology is $\alpha M(\lambda) = \lambda^2$, which displays increasing returns to scale. The efficiency of the matching technology rises from α =0.5 to α =1 (left panel), and the increase in participation rates goes from $\lambda = 1$ to $\lambda = 1.5$. In both cases, an additional class is created, and all classes are of smaller size than in the benchmark case.

[FIGURE 18 HERE]

If the increase in the encounter rate is large enough, the equilibrium might reach perfect assortative matching, i.e., the n^{th} ranked woman marries the n^{th} ranked man.

Proposition 3 *(Adachi 2003) As search costs become negligible, the set of equilibria converges to the set of stable matches derived under the deferred acceptance algorithm (Gale and Shapley 1962), with perfect assortative matching.*

See the appendix for a formal proof.

Propositions 2 and 3 formalize why individuals less exposed to the Season, such as the cohort of women affected by Queen Victoria's mourning period, married less assortatively with respect to class and land (Figures 1 and 8). It also explains why the children of the nobility sorted less into marriages after Seasons in which attendance was smaller due to a smaller cohort size (Tables 7 and 8).

8.3 Market segregation

Apart from an efficient matching technology and from increasing returns to scale, the London Season was also characterized by its segregative nature. Only royals, peers, landed gentry, and some successful commoners attended. This segregation was serious, to the extreme that masked balls, easily gate-crashed by commoners, were abandoned (Ellenberger 1990). Moreover, renting a house in Grosvenor Square or organizing a ball for hundreds of guests was not affordable by everyone. The high costs involved in participating in the Season excluded impoverished aristocrats who, after generations of gambling or mismanagement, were hard-pressed for money. In this section, I introduce endogenous segregation in the model and evaluate its effects on marital sorting.

Henceforth, for ease of exposition, I assume that the male and female populations are symmetric, i.e., that $\lambda^m = \lambda^w = 1$ and $F(x) = G(x)\ \forall x \in [0,1]$. I introduce a market maker to the economy who proposes excluding the least desirable suitors from the marriage market by charging a participation fee p. Each agent can then decide whether to go to the exclusive marketplace and avoid meeting these suitors at a cost p or to remain in the unrestricted marriage market. I call an equilibrium in which the least desirable suitors are excluded a segregation equilibrium.

Definition 2 *A segregation equilibrium is a measurable subset* $(z,1]$ *such that for all* $x \in (z,1]$, $\tilde{V}(x) - p \geq V(x)$, *where* $\tilde{V}$ *and* V *are the corresponding values of searching in the exclusive and the unrestricted marriage markets, respectively.*

Since the matching technology has increasing returns to scale, this model is subject to multiple equilibria. Here I show that a segregation equilibrium exists, and I do so by constructing one. I first define the marriage equilibria in the unrestricted and exclusive markets under segregation. After that, I calculate the equilibrium fee p^*. Finally, I show that under segregation no agent has an individual incentive to switch from the exclusive to the unrestricted market, or vice versa.

Provided that the segregation equilibrium exists, the unrestricted marriage market is characterized by a mass $F(z)$ of individuals distributed according to $\frac{f(x)}{F(z)}$. The equilibrium takes the form of a class partition $\{a^n\}_{n=0}^{N}$ in which the cluster's bounds a^n are defined according to Proposition 1. Similarly, the exclusive marriage market would be populated with $1 - F(z)$ individuals distributed over $\frac{f(x)}{1-F(z)}$. The equilibrium will also take the form of a class partition $\{\tilde{a}\}_{n=0}^{\tilde{N}}$.

The participation fee p has to be such that agents of type z do not want to switch to the exclusive marriage market. Note that a type z agent would be the most desirable individual in the unrestricted market. Thus, her value of search there would correspond to the value of search in the top class $[a^1, z]$

$$V(z) = \frac{\beta}{1-\beta}\frac{\alpha M(F(z))}{F(z)}\int_{V(z)}^{z}(x - V(z))\frac{f(x)}{F(z)}dx \ . \tag{8.3.3}$$

In contrast, in the exclusive marriage market, z would be on the lowest class $[z, \tilde{a}^{\tilde{N}}]$, with a value of search of

$$\tilde{V}(z) = \frac{\beta}{1-\beta}\frac{\alpha M(1-F(z))}{1-F(z)}\int_{z}^{\tilde{a}^{\tilde{N}}}(x - z)\frac{f(x)}{1-F(z)}dx \ . \tag{8.3.4}$$

Therefore, for the segregation equilibrium to exist, the participation fee has to be such that

$$p^* = V(z) - \tilde{V(z)} = \frac{\beta}{1-\beta}\alpha\left[\frac{M(F(z))}{F(z)}\int_{V(z)}^{z}(x - V(z))\frac{f(x)}{F(z)}dx - \frac{M(1-F(z))}{1-F(z)}\int_{z}^{\tilde{a}^{\tilde{N}}}(x - z)\frac{f(x)}{1-F(z)}dx\right] .$$

Now I show that with this p^* and under the belief that types above z participate in the exclusive marriage market, all agents of type $x < z$ have an individual incentive to remain in the unrestricted market. First, consider all agents in $[a^1, z)$. Following the intuition in Proposition 1, they will behave in the same way as z in the unrestricted marriage market, since there they are desired by the highest type of the opposite sex. So, the value of searching for a mate in the unrestricted market is such that $V(x) = V(z) = a^1$ for all $x \in [a^1, z)$. Alternatively, if agents in $[a^1, z)$ switched to the exclusive marriage market, they would at most be included in the last marriage class, as agent z. It could even be the case that $\tilde{a}^{\tilde{N}} > x$ for some $x \in [a^1, z)$, which means that nobody in the exclusive marriage market would marry them. In such a case, she would only marry agents of type $x < z$ who also had switched markets and therefore have a value of search $\tilde{V}(x) \leq \tilde{V}(z)$. Altogether, this implies that for all $x \in [a^1, z)$, $V(x) \geq \tilde{V}(x) - p^*$, and thus they prefer the unrestricted market.

This result is not so clear for men and women in the second class of the unrestricted market, i.e., $x \in [a^2, a^1)$. If, for example, the exclusive marriage market is such that $\tilde{a}^{\tilde{N}} < z$, it might be that some of these individuals of type $x \in [a^2, a^1)$ are $x > \tilde{a}^{\tilde{N}}$. In that case, they would be accepted by the lowest class within the exclusive marriage market, implying $V(x) < V(z) = \tilde{V}(z) - p^* = \tilde{V}(x) - p^*$. Therefore, in order to have a segregation equilibrium, it must be that $z = \tilde{a}^{\tilde{N}}$. If this assumption holds, then $\tilde{V}(x) < \tilde{V}(z)$, implying that $V(x) > \tilde{V}(x) - p*$ for all $x < a^1$. In other words, individuals of type $x < a^1$ also prefer to remain in the unrestricted market.

Finally, I show that no type with $x > z$ has an incentive to switch markets. Consider first the individuals of type $x \in [z, \tilde{a}^{\tilde{N}-1})$, that is, in the lowest marriage class of the exclusive market. For them, $\tilde{V}(x) = \tilde{a}^{\tilde{N}-1} = \tilde{V}(z)$. If they instead switch to the unrestricted marriage market, they will be the most attractive types there, in the top class. Thus, $V(x) = V(z)$. It then follows that $\tilde{V}(x) - p = V(x)$. Since the equilibrium cluster's bounds $\tilde{a}^n$ are nondecreasing in x, for all $x > \tilde{a}^{\tilde{N}-1}$, the value of searching in the exclusive market is such that $\tilde{V}(x) > \tilde{a}^{\tilde{N}-1} = \tilde{V}(z)$. Then, $\tilde{V}(x) - p > \tilde{V}(z) - p = V(z) = V(x)$; that is, all types with $x > z$ prefer to pay the fee p^* and attend the exclusive market. This concludes the construction of the segregation equilibrium.

How would the marriage equilibrium in the exclusive marriage market be affected by an increase in segregation? Segregation softens the congestion externality imposed by agents who meet but will never match. This, in turn, increases the rate at which agents meet proper types, making them more prone to wait longer. As a consequence, sorting will increase.

To produce clear-cut comparative statics, I need to impose more structure on the matching technology. Consider a technology where the increasing returns to scale are such that the fraction of the population that is matched increases too fast with respect to the measure of agents. In such a case, segregation will have two effects: First, it will reduce the number of participants and consequently the speed of encounters between remaining singles. Second, segregation will soften the congestion externality and thus will decrease the rate at which one meets undesirable suitors. Since I am interested in understanding the second effect, I impose a limit on the degree of increasing returns to scale:

$$2\alpha \frac{M(\lambda)}{\lambda} \geq \alpha M_\lambda(\lambda) > \alpha \frac{M(\lambda)}{\lambda} \ . \tag{8.3.5}$$

I assume that the matching technology is less than quadratic: the number of matches increases by a factor less than 4 when the number of participants in the market doubles (Jacquet and Tan 2007).

The effects of an increase in segregation in the equilibrium degree of sorting are summarized in the following proposition:

Proposition 4 *As segregation increases (larger z), the degree of sorting in equilibrium increases.*

See the appendix for a formal proof.

Proposition 4 shows formally that the London Season, by segregating the rich and powerful from the poor and insignificant, induced a strong degree of marital sorting among the upper classes. For example, during Queen Victoria's mourning period, the marriage market lost exclusivity; eligible ladies were not presented at court, and royal parties did not give a stamp of authority to the Season. Consequently sorting in terms of class and landholdings decreased, as shown in Figures 1 and 8.

Figure 19 gives an example of how the class equilibrium changes as segregation increases. The model is calibrated for the case of symmetric populations ($\lambda^m = \lambda^w = 1$ and $F(x) = G(x)\ \forall x \in [0,1]$) with uniform distributions and a discount rate of $\beta = 0.8$. The matching technology is $\alpha M(\lambda) = \alpha\lambda^{1.1}$, which satisfies condition (6.3.5). The increase in segregation is from $z = 0$ to $z = 0.24$. Clearly, the degree of sorting increases because the choice set is restricted to more similar individuals. However, the fact that class bounds increase indicates that segregation also affects sorting by reducing the congestion externality.

[FIGURE 19 HERE]

The theoretical formalization of the search and matching process embedded in the Season yields several insights. First, the standard search and matching framework is able to accurately reproduce key features of the marital behavior of the British aristocracy. In particular, the comparative statics with respect to the efficiency of the matching technology mimic the empirical results. However, marriage behavior cannot be fully explained without incorporating two nonstandard inputs into the matching technology: increasing returns to scale[69] and, especially, endogenous market segregation. While the work of Bloch and Ryder (2000) and Jacquet and Tan (2007) is a step in the right direction, my findings call for further theoretical research on endogenous market segmentation.

9 Conclusion

A classic insight from the assignment literature is that search frictions in the matching process affect the degree of sorting (Burdett and Coles 1997, Eeckhout 1999, Bloch and Ryder 2000, Shimer and Smith 2000, Adachi 2003, Atakan 2006). This well-founded theoretical result, however, lacks strong empirical support (Fisman et al. 2008, Banerjee et al. 2009, Hitsch et al. 2010). In this paper, I establish a causal link between search frictions and marital sorting by analyzing the congregation of high society during the London Season. From Easter to August every year, the children of the nobility engaged in a whirl of social events. From presentations at court to royal parties, the objective was to pull together the right sort of suitors and to aid its introduction and courtship. When the Season worked smoothly, it effectively reduced search costs for partners. As a consequence, the children of the nobility sorted more in the marriage market on the basis of social status and landholdings.

To establish causality, I focus on three years when the Season was disrupted by the death of Prince Albert (1861–63). Marriage behavior changed dramatically. The generation of ladies affected by the disruption were more likely to marry a commoner and married spouses with smaller landholdings. Moreover, geographical distance between spouses' family seats shrunk,

[69] The marital matching function is usually modeled as a constant returns to scale technology. Notable exceptions include Mortensen (1988), Chiappori and Weiss (2000), Aderberg and Mongrain (2001), and Gautier et al. (2010).

indicating that the partner selection problem shifted to the local marriage markets temporarily. To quantify the magnitude of these effects, I use changes in the size of the marriageable cohort as a source of identifying variation. I find that when the marriageable cohort was large, the Season was well attended. As a result, marital sorting strengthened. Every 250 additional attendees at royal parties reduced by 1 percent the probability of marrying a commoner for the average peer daughter. For great lords, these additional attendees increased by 1.5 percent the probability of marrying endogamously in terms of acreage and annual rents from land.[70]

I also discuss the broader economic implications of these sorting patterns. In particular, I focus on the Season's effects on social mobility, inequality, and the provision of public education. Using a counterfactual analysis I find that between 1851 and 1875, the rate of intermarriage between peers' daughters and commoners would have been 30 percent higher in the absence of this institution. Interestingly, there is a strong and significant correlation between sorting and inequality over the very long-run. In counties where noble dynasties intermarried more with commoners over the centuries, land became more unequally distributed. This huge inequality harmed economic performance. Counties where land was more concentrated systematically underinvested in public schooling.

In sum, this paper suggests that if bustling Seasons like the one of 1864 had not been in place, ladies like Lucy Lyteltton probably would not have met such wealthy and powerful grooms as Lord Frederick Cavendish. However, Lucy's respectable and lasting marriage came at the cost of an increased inequality for the British society as a whole.

The Season is clearly an institution from another age, but today's marriage market is not free of segregation. Laumann et al. (1994, Table 6.1) document that 60 percent of all married couples in the United States met in school, at work, at a private party, in church, or at a gym/ social club. All of these are, to some extent, segregative marriage markets where entry is restricted to similar others. In addition, several matchmaking services not only guarantee you will find love, but also that you will not waste time meeting people with whom you would never match.[71] Such services do not have to be used by a large fraction of the population to

[70]Specifically, an endogamous marriage is defined as one in which the husband and the wife's families belong to the same land class. Land classes are defined according to Bateman's categorization (Bateman 1883: p. 495) and in terms of deciles (marrying within your same or a contiguous decile of the distribution).

[71]Gray and Farrar, for example, an exclusivist matchmaker operating in London for the last 23 years, only accepts "the most eligible singles." The cheapest fee is of 15,000 pounds. As their motto says, "this service is

have implications for broader economic outcomes. Piketty and Saez (2006) show that over the last 50 years, inequality has risen and that this trend is mainly driven by only the top 0.1 percent of the population. My findings suggest that if the very rich, this top 0.1 percent are somehow involved in segregative matchmaking, the effects on the degree of marital sorting will be dramatic. Over the long-run, this may reinforce social and economic inequality, with important implications for broader political and economic outcomes, including the provision of public goods, taxation, or ultimately, economic growth. This is how it was in the past and it is likely to happen again.

References

Abramitzky, R., A. Delavande, and L. Vasconcelos (2011). "Marrying Up: The Role of Sex Ratio in Assortative Matching". *American Economic Journal: Applied Economics* 3(3): pp. 124–57.

Adachi, H. (2003). "A Search Model of Two-Sided Matching under Nontransferable Utility". *Journal of Economic Theory* 113(2): pp. 182–198.

Aderberg, D. and S. Mongrain (2001). "Marriage, Divorce and Earnings-Risk". Technical report, University of Stirling and Simon Fraser University.

Aiello, D. (2010). "The London Season". Last modified November 22, 2010. Accessed May 9, 2011. http://www.thehistorybox.com/ny_city/society/printerfriendly/nycity_society_london_season_article0008.htm.

Allen, D. W. (2009). "A Theory of the Pre-Modern British Aristocracy". *Explorations in Economic History* 46(3): pp. 299–313.

Allen, D. W. (2012). *The Institutional Revolution: Measurement and the Economic Emergence of the Modern World*. Chicago: University of Chicago Press.

Altonji, J. G., T. E. Elder, and C. R. Taber (2005). "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools". *Journal of Political Economy* 113: pp. 151–184.

Angrist, J. (2002). "How Do Sex Ratios Affect Marriage and Labor Markets? Evidence from America's Second Generation". *Quarterly Journal of Economics* 117(3): pp. 997–1038.

Atakan, A. E. (2006). "Assortative Matching with Explicit Search Costs". *Econometrica* 74(3): pp. 667–680.

Austen, J. (1813). *Pride and Prejudice*. Whitehall: T. Egerton.

not right for everybody" (grayandfarrar.com). Across the pond, Kelleher International, a long-running, high-end matchmaking service, is targeting Silicon Valley with particular vigor (see D. Crane's *New York Times* article on October 11, 2013).

Banerjee, A., E. Duflo, M. Ghatak, and J. Lafortune (2009). "Marry for What: Caste and Mate Selection in Modern India". Working Paper 14958, National Bureau of Economic Research.

Bateman, J. (1883). *The Great Landowners of Great Britain and Ireland, A List of all Owners of Three Thousand Acres and Upwards, Worth £3,000 a year; Also, One Thousand Three Hundred Owners of Two Thousand Acres and Upwards, in England, Scotland, Ireland, & Wales, their Acreage and Income from Land, Culled from 'The Modern Domesday Book'.* London: Harrison and Sons.

Becker, G. S. (1973). "A Theory of Marriage: Part I". *Journal of Political Economy* 81(4): pp. 813–46.

Beckett, J. V. (1986). *The Aristocracy in England 1660-1914.* Oxford: Blackwell.

Bhrolchain, M. N. (2001). "Flexibility in the Marriage Market". *Population: An English Selection* 13(2): pp. 9–47.

Bloch, F. and H. Ryder (2000). "Two-Sided Search, Marriages, and Matchmakers". *International Economic Review* 41(1): pp. 93–115.

Botticini, M. and A. Siow (2011). "Are There Increasing Returns to Scale in Marriage Markets?". Working Papers 395, IGIER (Innocenzo Gasparini Institute for Economic Research), Bocconi University.

Burdett, K. and M. G. Coles (1997). "Marriage and Class". *Quarterly Journal of Economics* 112(1): pp. 141–168.

Burdett, K. and M. G. Coles (1999). "Long-Term Partnership Formation: Marriage and Employment". *Economic Journal* 109(456): pp. F307–F334.

Burke, J. (1826). *A General and Heraldic Dictionary of the Peerage and Baronetage of the United Kingdom.* London: Henry Colburn.

Burke, J. (1898). *Burke's Landed Gentry.* London: Burke's family et al.

Burke, J. (2003). *Burke's Peerage, Baronetage & Knightage.* 107th edition. Edited by Charles Mosley. Wilmington: Burke's Peerage (Genealogical Books).

Burke's Family et al. (2005). *The History of Burke's Landed Gentry.* Scotland: Burke's Peerage & Gentry.

Cannadine, D. (1990). *The Decline and Fall of the British Aristocracy.* New Haven: Yale University Press.

Cannon, J. (1984). *Aristocratic Century: The Peerage of Eighteenth-Century England.* Cambridge: Cambridge University Press.

Cavendish [Lyttelton], L. C. (1927). *The Diary of Lady Frederick Cavendish, vol. 1 and 2.* Edited by John Bailey. New York: Frederick A. Stokes.

Chiappori, P. A. and Y. Weiss (2000). "Marriage Contracts and Divorce: An Equilibrium Analysis". mimeo, University of Chicago.

Clark, G. (2010). "Regression to Mediocrity? Surnames and Social Mobility in England, 1200-2009". Working paper, Available at SSRN.

Clark, G. and N. Cummins (2012). "What is the True Rate of Social Mobility? Surnames and Social Mobility, England 1800-2012". Manuscript, University of California, Davis, and Queen's College, CUNY.

Cokayne, G. E. (1913). *The Complete Peerage of England, Scotland, Ireland, Great Britain and the United Kingdom*. London: The St. Catherine Press, Ltd.

Collin, E. J. and J. M. McNamara (1990). "The Job Search Problem as an Employer-Candidate Game". *Journal of Applied Probability* 28: pp. 815–827.

Collins, A. (1756). *The Peerage of England*. London: Innys et al.

Costa, D. L. and M. E. Kahn (2000). "Power Couples: Changes in the Locational Choice of the College Educated, 1940–1990". *Quarterly Journal of Economics* 115(4): pp. 1287–1315.

Crane, D. (October 11, 2013). "The High-End Matchmaking Service for Tycoons". *New York Times*. Accessed October 13, 2013. http://www.nytimes.com/2013/10/13/fashion/the-high-end-matchmaking-service-for-tycoons.html?ref=style&_r=1&.

Davidoff, L. (1973). *The Best Circles: Society, Etiquette, and the Season*. London: Cromm Hel.

Debrett, J. (1814). *The Peerage of the United Kingdom of Great Britain and Ireland, vol. 1*. London: G. Woodfall.

Diamond, P. A. (1981). "Mobility Costs, Frictional Unemployment, and Efficiency". *Journal of Political Economy* 89(4): pp. 798–812.

Doepke, M. and F. Zilibotti (2008). "Occupational Choice and the Spirit of Capitalism". *Quarterly Journal of Economics* 123(2): pp. 747–793.

Douglas, R. (1904). *Scots Peerage*. Edinburgh: Douglas.

Eeckhout, J. (1999). "Bilateral Search and Vertical Heterogeneity". *International Economic Review* 40(4): pp. 869–887.

Ellenberger, N. W. (1990). "The Transformation of London 'Society' at the End of Victoria's Reign: Evidence from the Court Presentation Records". *Albion: A Quarterly Journal Concerned with British Studies* 22(4): pp. 633–653.

Ellis, G., C. Jamison, E. Keate, and M. Rollings (1904). *Royal Places of England*. London: R.S. Rait, Constable & Company Ltd.

Fernandez, R., N. Guner, and J. Knowles (2005). "Love and Money: A Theoretical and Empirical Analysis of Household Sorting and Inequality". *Quarterly Journal of Economics* 120(1): pp. 273–344.

Fernandez, R. and R. Rogerson (2001). "Sorting and Long-Run Inequality". *Quarterly Journal of Economics* 116(4): pp. 1305–1341.

Fisman, R., S. S. Iyengar, E. Kamenica, and I. Simonson (2008). "Racial Preferences in Dating". *Review of Economic Studies* 75(1): pp. 117–132.

Gale, D. and L. S. Shapley (1962). "College Admissions and the Stability of Marriage". *American Mathematical Monthly* 69(1): pp. 9–15.

Galor, O. and O. Moav (2006). "Das Human-Kapital: A Theory of the Demise of the Class Structure". *Review of Economic Studies* 73(1): pp. 85–117.

Galor, O., O. Moav, and D. Vollrath (2009). "Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence". *Review of Economic Studies* 76(1): pp. 143–179.

Gautier, P. A., M. Svarer, and C. N. Teulings (2010). "Marriage and the City: Search Frictions and Sorting of Singles". *Journal of Urban Economics* 67(2): pp. 206 – 218.

Goñi, M. (2013). "Landed Elites and Public Education in England and Wales. Evidence from School Boards, 1870–99". Manuscript, Universitat Pompeu Fabra.

Gray&Farrar. "The Ultimate Matchmaking Service". Accessed October 4, 2013. http://grayandfarrar.com.

Habakkuk, H. J. (1940). "English Landownership, 1680–1740". *Economic History Review* 10(1): pp. 2–17.

Hitsch, G. J., A. Hortacsu, and D. Ariely (2010). "Matching and Sorting in Online Dating". *American Economic Review* 100(1): pp. 130–63.

Hobhouse, H. (1983). *Prince Albert: His Life and Work*. London: Hamish Hamilton.

Hollingsworth, T. H. (1957). "A Demographic Study of the British Ducal Families". *Population Studies* 11(1): pp. 4–26.

Hollingsworth, T. H. (1964). "The Demography of the British Peerage". *Population Studies Supplement*.

Inwood, S. (1998). *A History of London*. London: Papermac.

Jacquet, N. L. and S. Tan (2007). "On the Segmentation of Markets". *Journal of Political Economy* 115(4): pp. 639–664.

Kremer, M. (1997). "How Much Does Sorting Increase Inequality?". *Quarterly Journal of Economics* 112(1): pp. 115–39.

Laumann, E. O., J. H. Gagnon, R. T. Michael, and S. Michaels (1994). *The Social Organization of Sexuality: Sexual Practices in the United States*. Chicago: University of Chicago Press.

Lee, S. (2008). "Preferences and Choice Constraints in Marital Sorting: Evidence From Korea". Discussion Papers 07–042, Stanford Institute for Economic Policy Research.

Lodge, J. (1859). *The Peerage of Ireland*. Dublin: James Moore.

Londonseason.net. "The History of the London Season". Accessed March 10, 2010. http://thelondonseason.net/the-london-season/history/.

Long, J. and J. Ferrie (2013). "Intergenerational Occupational Mobility in Great Britain and the United States since 1850". *American Economic Review* 103(4): pp. 1109–37.

Malheiro, B. (1999). "1876 Victorian England Revisited". Last modified 1999. Accessed May 15, 2011. http://logicmgmt.com/1876/splash.htm.

McCloskey, D. N. and L. G. Sandberg (1971). "From Damnation to Redemption: Judgments on the Late Victorian Entrepreneur". *Explorations in Economic History* 9(1): pp. 89–108.

Miles, A. (1993). "How Open Was Nineteenth-Century British Society? Social Mobility and Equality of Opportunity, 1839–1914". In A. Miles and D. Vincent (Eds.), *Building European Society: Occupational Change and Social Mobility in Europe, 1840–1940*. Manchester: Manchester University Press.

Miles, A. (1999). *Social Mobility in Nineteenth and Early Twentieth-Century England*. London: Macmillan.

Mingay, G. E. (1963). *English Landed Society in the Eighteenth Century*. London: Routledge & Kegan Paul.

Mitch, D. F. (1993). "Inequalities Which Every One May Remove: Occupational Recruitment, Endogamy, and the Homogeneity of Social Origins in Victorian England". In A. Miles and D. Vincent (Eds.), *Building European Society: Occupational Change and Social Mobility in Europe, 1840–1940*. Manchester: Manchester University Press.

Mortensen, D. T. (1988). "Matching: Finding a Partner for Life or Otherwise". *American Journal of Sociology* 94: pp. S215–S240.

Mortensen, D. T. (1993). "The Matching Process as a Non-Cooperative/Bargaining Game". In J. J. McCall (Ed.), *The Economics of Information and Uncertainty*. Chicago: Chicago University Press.

Mortensen, D. T. and C. A. Pissarides (1994). "Job Creation and Job Destruction in the Theory of Unemployment". *Review of Economic Studies* 61(3): 397–415.

Nevill, D. (1910). *Under Five Reigns*. New York: The John Lane company.

Nevill, D. (1920). *The Reminiscences of Lady Dorothy Nevill*. London: Thomas Nelson and Son.

Persson, T. and G. Tabellini (1994). "Is Inequality Harmful for Growth?". *American Economic Review* 84(3): pp. 600–621.

Piketty, T. and E. Saez (2006). "The Evolution of Top Incomes: A Historical and International Perspective". *American Economic Review* 96(2): pp. 200–205.

Pissarides, C. A. (1984). "Efficient Job Rejection". *Economic Journal* 94: pp. 97–108.

Porter, D. (1998). *The Thames Embankment: Environment, Technology, and Society in Victorian London*. Akron: University of Akron Press.

Pullar, P. (1998). *Gilded Butterflies: The Rise and Fall of the London Season*. London: Hamish Hamilton.

Roodman, D. (2007). "CMP: Stata Module to Implement Conditional (Recursive) Mixed Process Estimator". Technical report, Statistical Software Components, Boston College Department of Economics.

Sheppard, F. H. W. (1971). *London, 1808–1870: The Infernal Wen*. London: Secker and Warburg.

Sheppard, F. H. W. (1977). "The Social Character of the Estate: The London Season in 1841". *Survey of London: volume 39: The Grosvenor Estate in Mayfair, Part 1 (General History)*: pp. 89–93. http://www.british--history.ac.uk/report.aspx?compid=41842.

Shimer, R. and L. Smith (2000). "Assortative Matching and Search". *Econometrica* 68(2): pp. 343–369.

Smith, L. (1995). "Cross-Sectional Dynamics in a Two-Sided Matching Model". Working papers 95-14, Massachusetts Institute of Technology (MIT), Department of Economics.

Sokoloff, K. L. and S. L. Engerman (2000). "Institutions, Factor Endowments, and Paths of Development in the New World". *Journal of Economic Perspectives* 14(3): pp. 217–232.

Spring, E. and D. Spring (1985). "The English Landed Elite, 1540–1879: A Review". *Albion: A Quarterly Journal Concerned with British Studies* 17(2): pp. 149–166.

Staiger, D. and J. H. Stock (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica* 65(3): pp. 557–586.

Stephens, W. (1998). *Education in Britain, 1750–1914 (Social History in Perspective)*. New York: St. Martin's Press.

Stone, L. (1969). "Literacy and Education in England, 1600–1900". *Past and Present* 42: pp. 69–129.

Stone, L. and J. F. Stone (1984). *An Open Elite? England 1540–1880*. Oxford: Clarendon Press.

Trollope, A. (1875). *The Way We Live Now*. London: Chapman and Hall.

Turner, E. (1954). *A History of Courting*. London: Ian Henry.

Vincenty, T. (1975). "Direct and Inverse Solutions of Geodesics on the Ellipsoid with Application Nested Equations". *Survey Review* 22(176): pp. 88–93.

Wasson, E. A. (1998). "The Penetration of New Wealth into the English Governing Class from the Middle Ages to the First World War". *Economic History Review* 51(1): pp. 25–48.

Wilde, O. (1895). *An Ideal Husband*. London: Dover Thrift Editions.

Wilkins, K. (2010). "Elite Networks of the London Season: Perspectives from the New Mobilities Literature". Technical report, Durham theses, Durham University. Available at Durham http://etheses.dur.ac.uk/689/.

Data Sources

Bateman, J. (1883). *The Great Landowners of Great Britain and Ireland*, London: Harrison and Sons.

Burke, J. (1826). *A General and Heraldic Dictionary of the Peerage and Baronetage of the United Kingdom*, London: Henry Colburn.

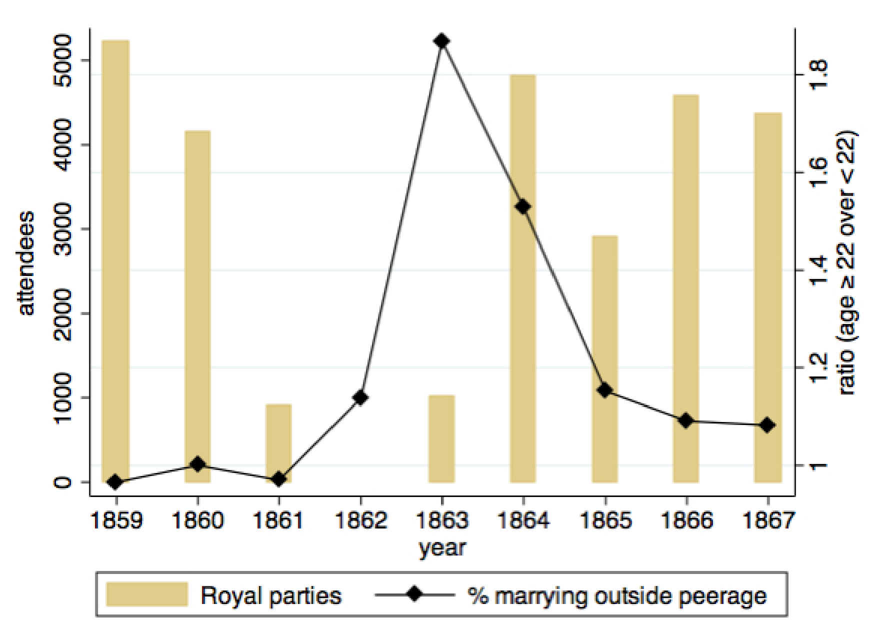
Hollingsworth, T. H. (1965). "Hollingsworth Genealogical Data on the British Peerage," provided by the Cambridge Group for the History of Population and Social Structure.

Mitchell, B. R. (1988). *British Historical Statistics*, Cambridge: Cambridge University Press.

National Archives, Kew. Concerts and Ball lists (1851–75) in Lord Chamberlain's Department: Records of *Levees*, Drawing Rooms, Balls, Concerts and Garden Parties , LC 6/31–55.

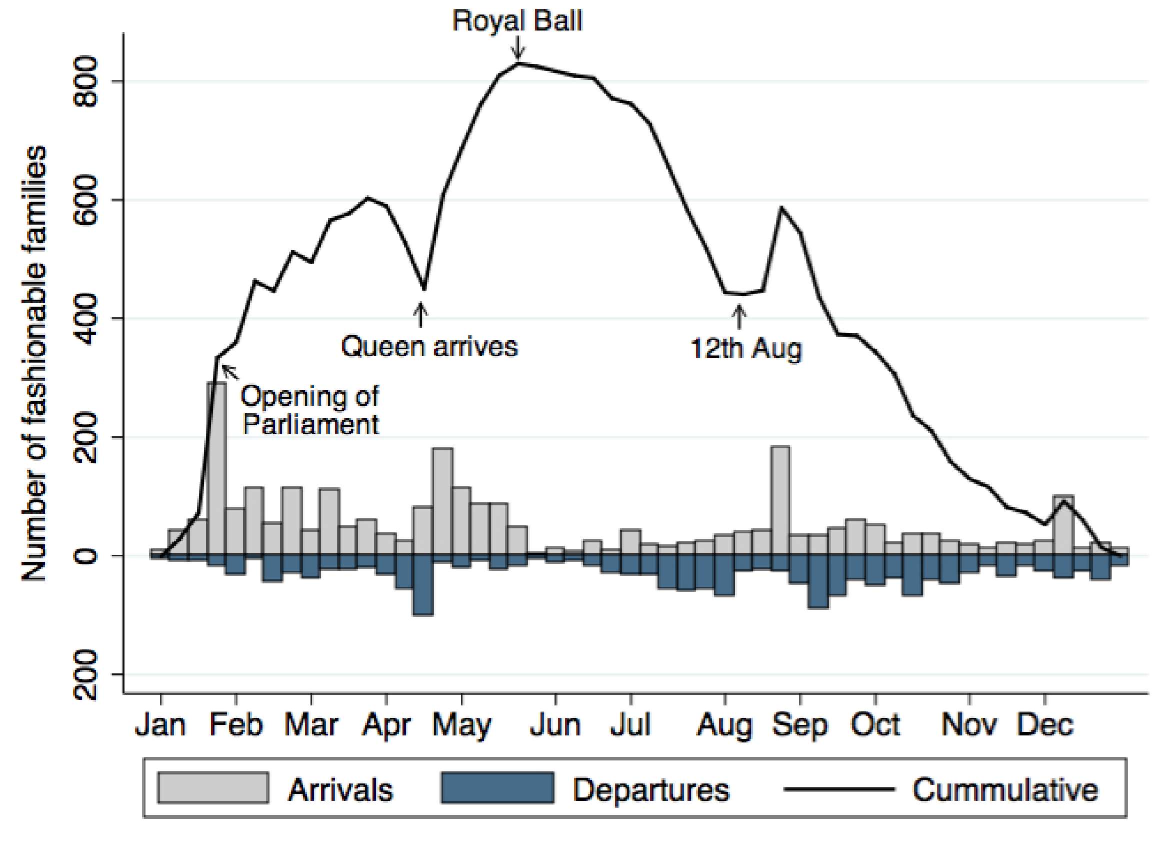
10 Figures and tables

Figure 1: Queen Victoria's mourning on the relative probability of marrying outside the peerage (women aged over 22 in 1861 relative to women below 22)



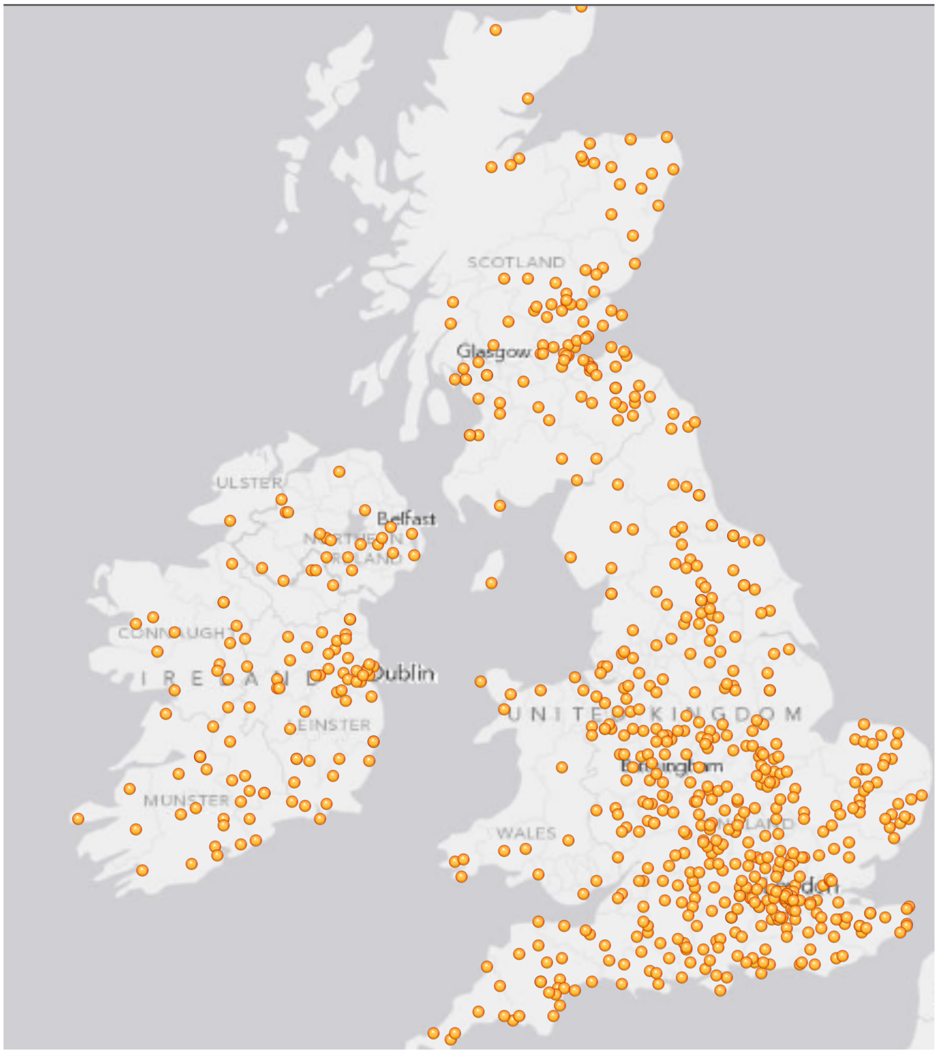
Note: Shaded bars show the number of attendees at royal parties per year (left axis). Royal parties were interrupted from 1861 to 1863 due to Queen Victoria's mourning. For the connected line, the sample are all 276 peers' daughters first marrying in 1859–67. Diamonds display the rate of intermarriage for women older than 22 on January 1, 1861, relative to women below this cutoff age (right axis). Younger ladies are not expected to be severely affected by the interruption of the Season, since they could delay their choice of husband until everything went back to normal. However, ladies aged 22 or more in 1861 could not wait long: otherwise, they would be written off as failures according to social norms at the time. Further, around 1861 most ladies married around ages 22 to 25 (Figure A4). Since women aged 22 or more in 1861 would be 25 or more when the Season resumed in 1864, waiting was not an option for them. Finally, the years before 1858 are excluded from the analysis because women aged below 22 were only 17 or 18 years old by then and thus too young to marry.

Figure 2: Seasonable Migrations of the “Fashionable World” in 1841



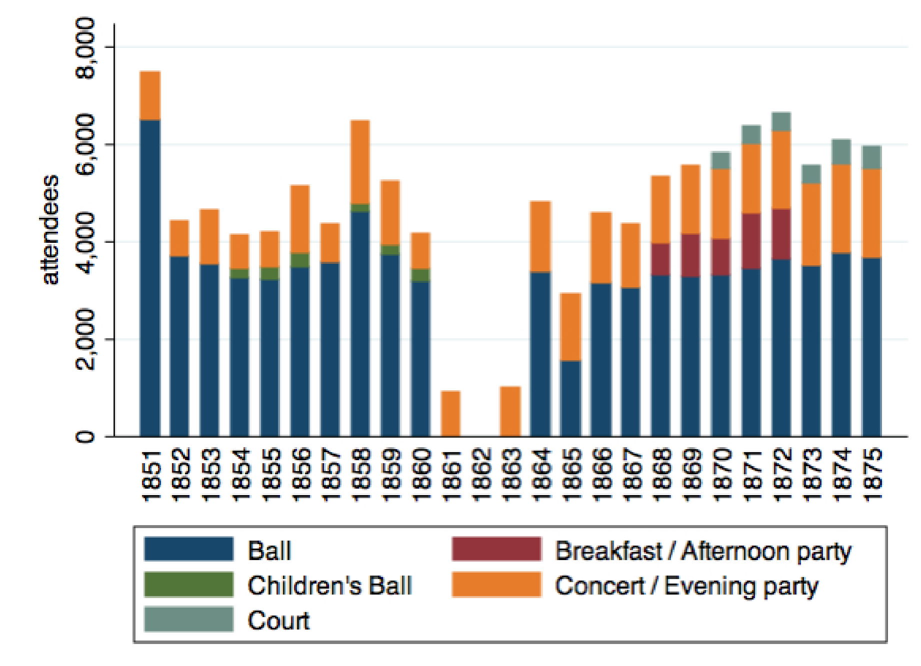
Source: Sheppard (1977).
Note: “This figure plots over 4,000 movements into and out of London of members of the “Fashionable World”, as resorted in The Morning Post in 1841. Movements of single individuals or of married couples or of whole families are all expressed as one movement. Thus the total number of persons arriving and departing was in reality much larger than that given here. The hatched columns show the total number of arrivals and departures reported in each week. Sometimes there was a time lag of up to ten days between the date of a movement and its publication. The heavy black line shows the cumulative total of arrivals after subtraction of departures. The departures were not so fully reported as the arrivals, and to correct this shortfall the departures have been multiplied by a factor of 1.6” Sheppard (1977).

Figure 3: Country seats



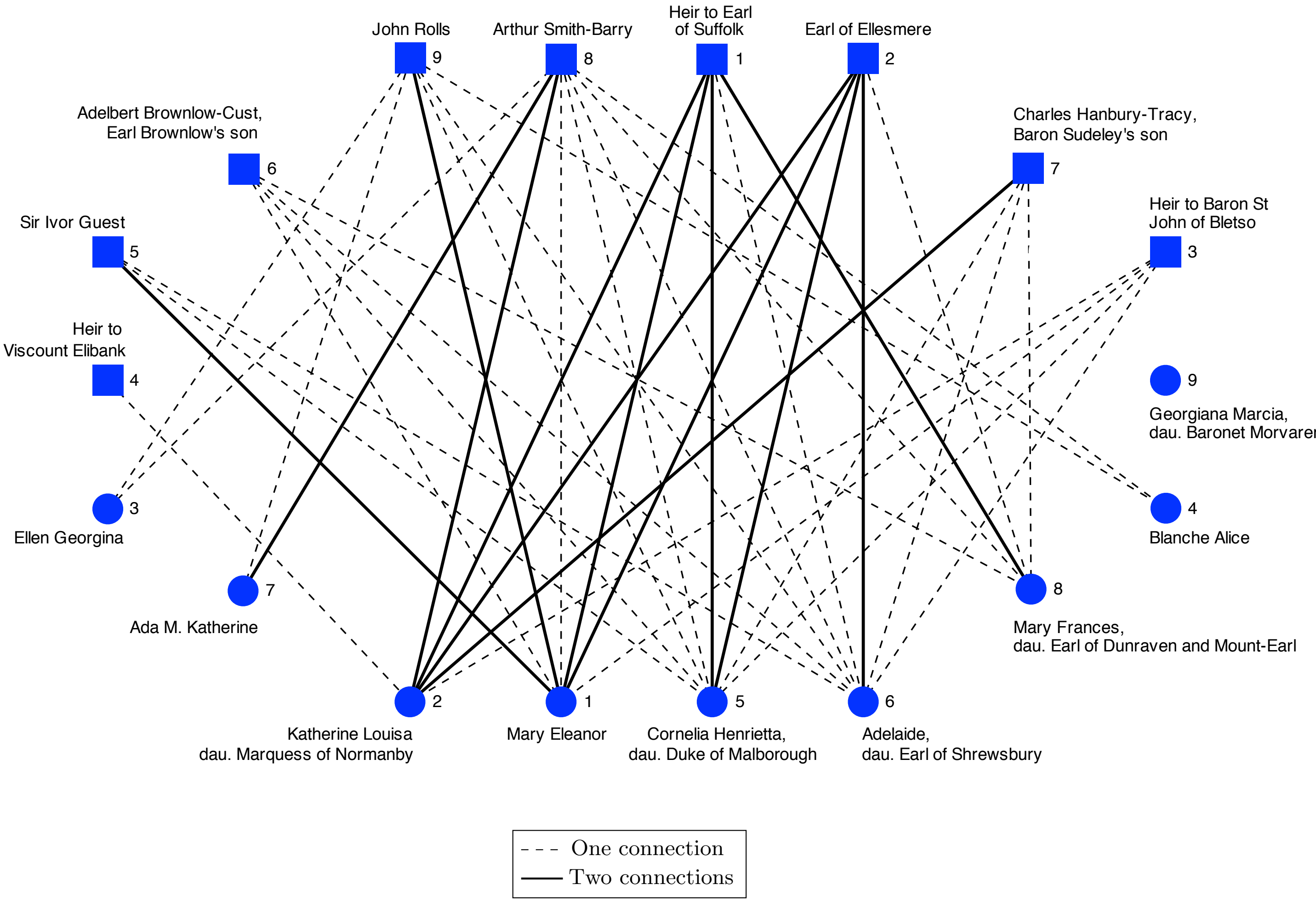
Note: This figure shows the location of the country seats computerized and geocoded from Burke's *Heraldic Dictionary* (1826). The sample includes 694 country seats from 498 families holding a peerage.

Figure 4: Number of attendees at royal parties, by type of event



Note: The sample comprises all 126 parties held at Buckingham, St. James' Palace, and Windsor during the London Season from 1851 to 1875. The number of attendees was collected from the invitation lists written by the Lord Chamberlain (British National Archives, LC 6/31–55). Balls include state balls and costume balls at Buckingham. Court refers to the Queen's diplomatic and official court at Buckingham. The initial year, 1851, displays unusually high attendance rates, explained by the Crystal Palace Exhibition. Between 1861 and 1863, most royal parties were cancelled due to Queen Victoria's mourning for her mother (died March 16, 1861), and her husband (died December 14, 1861).

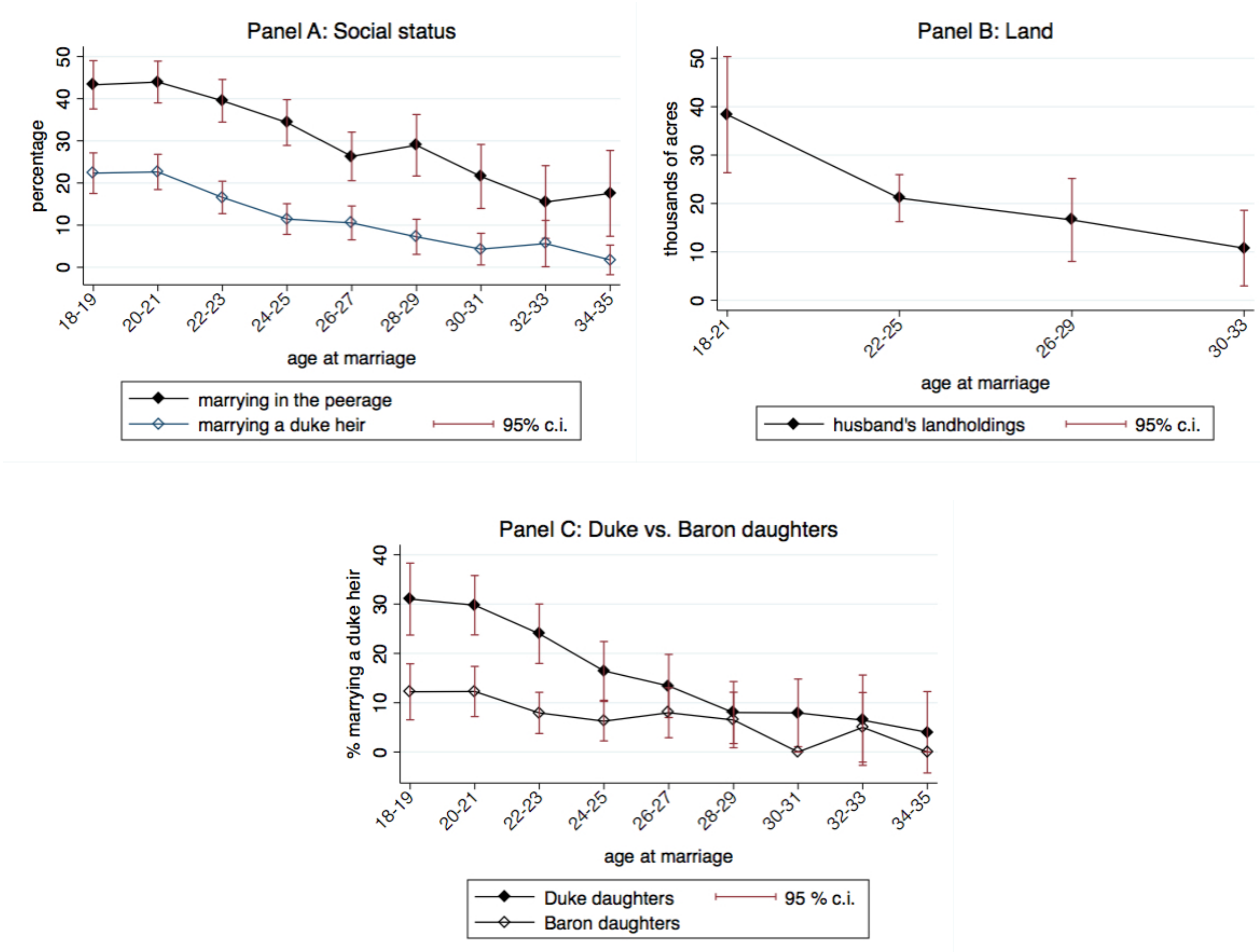
Figure 5: Network diagram of peer great landowners and their spouses, 1868.



	Spouses	All
Average links per node	0.867	0.654
Average distance	1.5	1.861
Network density	0.667	0.506

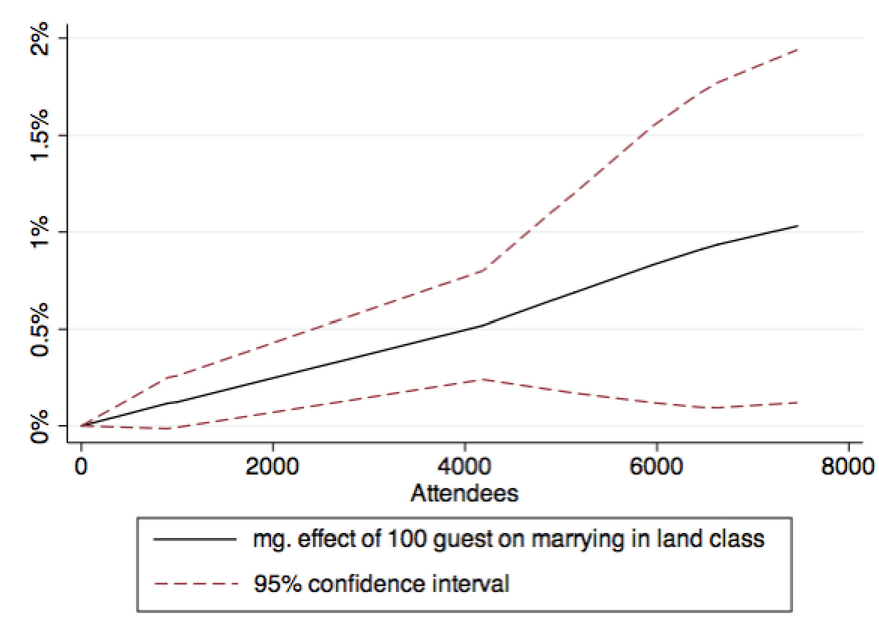
Note: The sample is all peers and peers' sons who married in 1868, together with their wives. Square nodes stand for men, circle nodes for women. Lines represent links between individuals of the opposite sex. A link is established if the man and the woman's fathers have the same social status (dukes vs. barons vs. commoners), if their families are in possession of estates of similar size (defined according to Bateman's categorization, p. 497), or if the man and any relative of the woman belong to the same club. Dashed lines indicate one connection; thick lines indicate two connections. Nodes are labeled with the name of the individual and her relation to the peerage in 1868. Matched spouses are labeled with the same number. In the descriptive statistics, distance is defined as the number of links on the shortest path connecting two nodes in a network. Network density is the number of actual connections relative to the number of potential connections. To calculate this density measure, I assume that the maximum number of links between two individuals of the opposite sex is one (e.g., a man and a woman who hold the same social status and belong to the same clubs are considered to be linked only once).

Figure 6: Implied market value of women (1801–75), by age group.



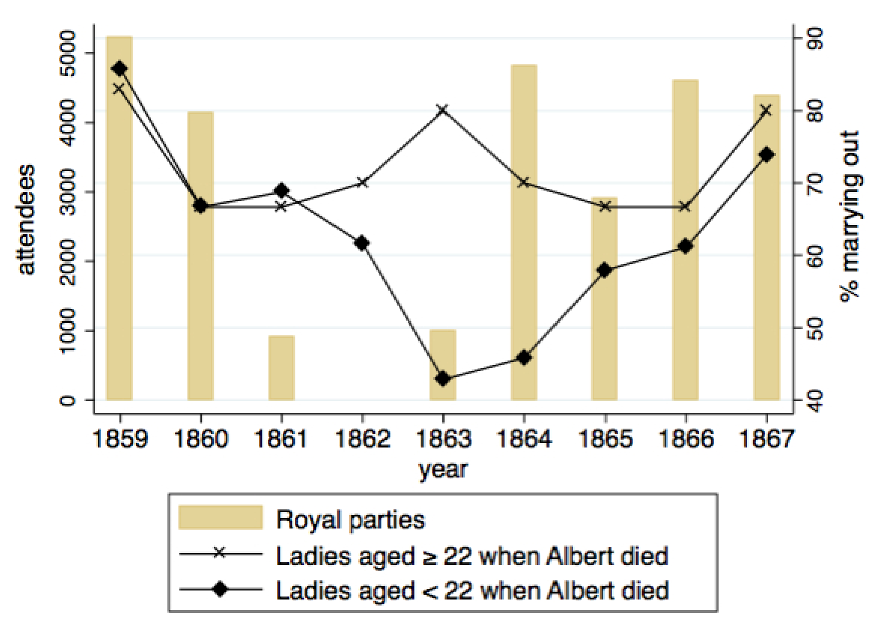
Note: The sample for Panel A is all 1,963 women first marrying in 1801–75. Women younger than 18 or older than 35 are excluded. Diamonds indicate the percentage of women marrying a peer or a peer son. Hollow diamonds indicates the percentage of women marrying a duke heir. The sample for Panel B is all 178 women first marrying a peer great landowner in 1801–75. Women younger than 18 or older than 33 are excluded. Age groups are larger than in Panel A because the sample is smaller. Finally, the sample for Panel C is the same as for Panel A. However, here women are split in two groups: duke daughters and baron daughters. The corresponding diamonds indicate the percentage of marriages with a duke heir.

Figure 7: Increasing returns to scale in the London Season. Marrying in the same land class



Note: This figure plots the marginal effect of 100 additional attendees to royal parties on the probability of marrying in your same acreage class. Classes are defined as in Bateman's *Great Landowners* (1883: p. 495): 2,000–6,000 acres, 6,000–10,000 acres, 10,000–20,000 acres, 20,000–50,000 acres, 50,000–100,000 acres, and 100,000 or more acres. To estimate the marginal effects, I use the probit IV model in Table 7, top panel, column (2). This marginal effect is evaluated at different values of attendance (x-axis) and at the means of all other variables.

Figure 8: The effects of Queen Victoria's mourning period on peer-commoner intermarriage

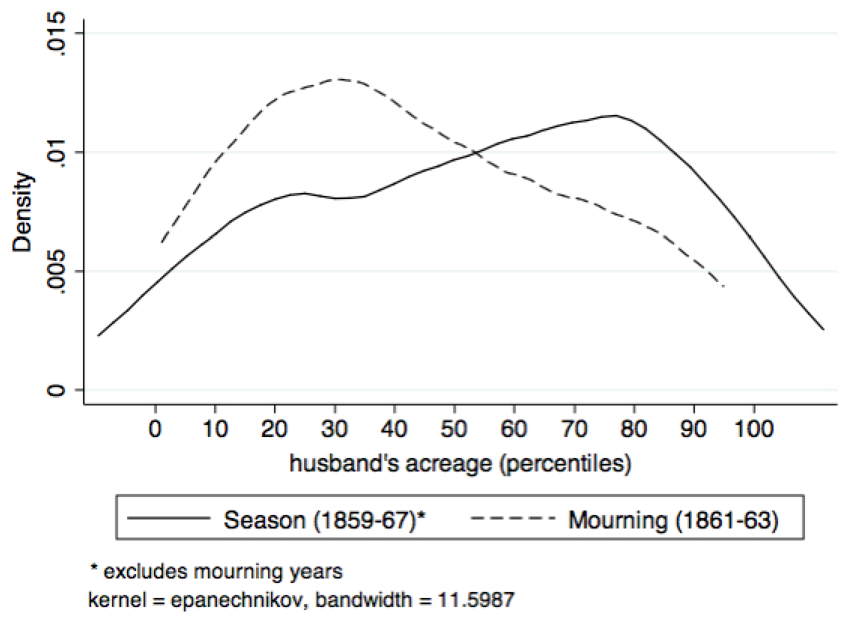


Note: Shaded bars show the number of attendees at royal parties per year (left axis). Royal parties were interrupted in 1861–63 due to Queen Victoria's mourning. The sample for the diamond line are all 143 peers' daughters who first married between 1859 and 1867, and were under 22 on January 1, 1861. For the x-line, the sample comprises all 133 peers' daughters who first married between 1859 and 1867, but were 22 or more on January 1, 1861. The latter were more hard-pressed to marry soon, even if they had to do so under a disrupted Season. Diamonds and x's display the percentage of marriages outside the peerage for women in each age group.

Figure 9: Deferred marriage decision of ladies aged below 22 in 1861

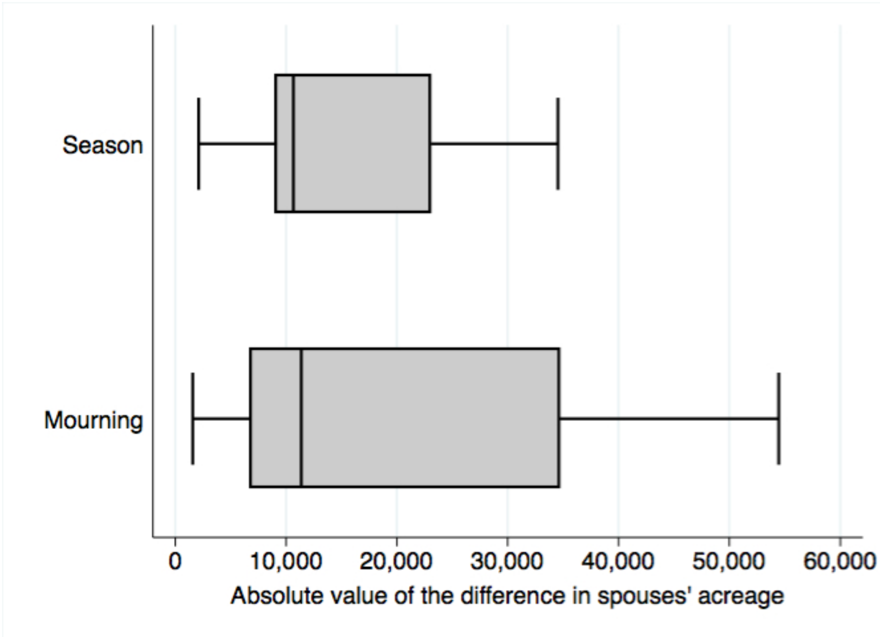
Note: The sample for the filled diamond line is all 254 peers' daughters aged 17 to 21 on January 1, 1861. For the hollow diamond line, the sample comprises all 262 peers' daughters who were 22 to 26 as of this date. Diamonds represent the marriage hazard rate the percentage of single women who get married at each age. Since women aged below 22 in 1861 could delay their choice of partner until the Season resumed in 1864, their marriage hazard rates should be relatively high at older ages. Finally, the "hazard rate during mourning" is the percentage of single women marrying during the whole 1861–63 period in each of the two groups.

Figure 10: The effects of Queen Victoria's mourning period on husbands' landholdings



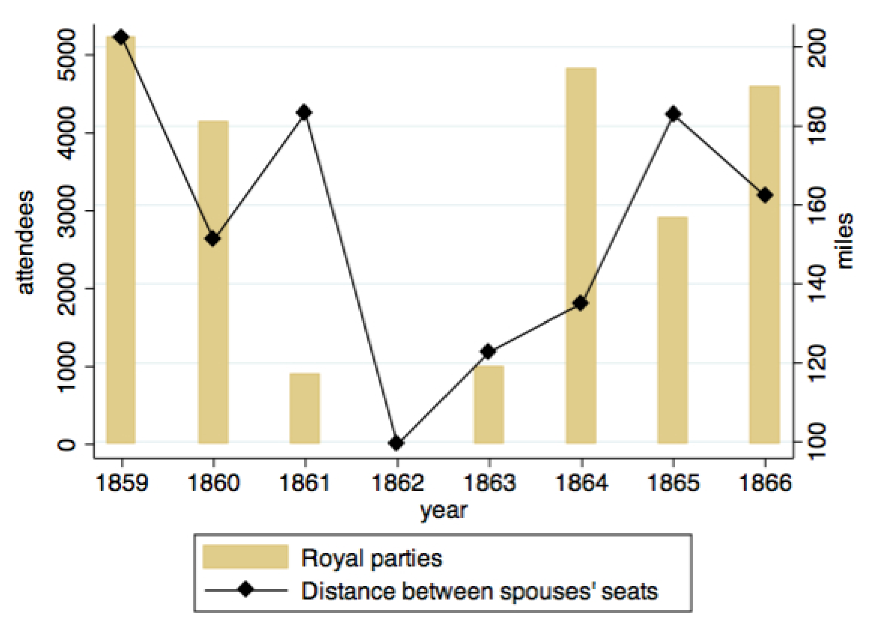
Note: The sample includes all peers' daughters first marrying in 1859–67. Those for which Bateman's *Great Landowners* (1883) did not provide information on the landholdings of the husband's family are excluded. Women marrying commoner husbands are also excluded because land does not accurately proxy their husbands' wealth. Thus, the final sample includes 105 women. The figure plots the kernel densities for the husband's family acreage for two subsamples: women marrying during the interruption of the Season (1861–63) versus those marrying when it worked smoothly (1859–60 and 1864–67). The distribution of landholdings is presented in percentiles. To calculate the kernel density estimate, I use the Epanechnikov kernel with a 11.5987 width.

Figure 11: The effects of Prince Albert's mourning on sorting in acreage



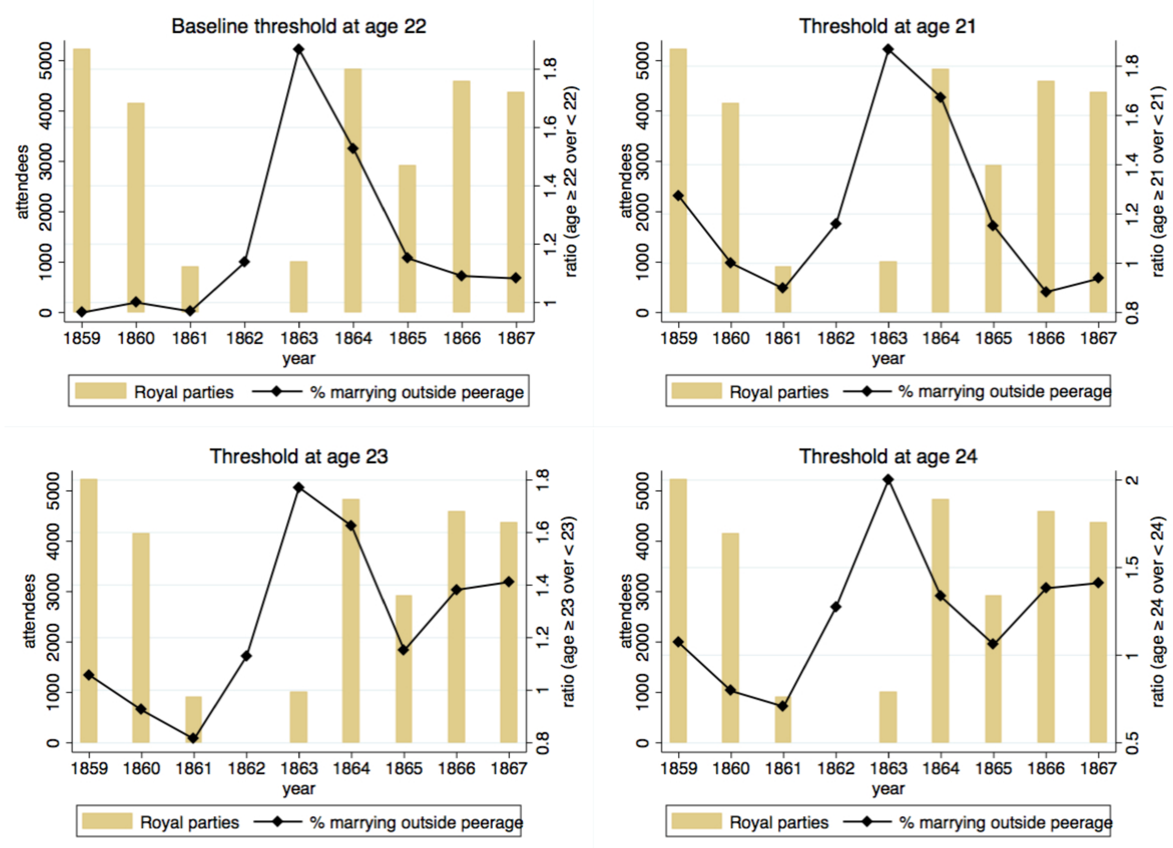
Note: The sample is all peers in possession of 2,000 acres and upwards first marrying in 1859–67. The first box is for those marrying when the Season worked smoothly (1859–60 and 1864–67); the second box is for those marrying when the Season was interrupted (1861–63). Individuals marrying commoner wives are excluded because land does not accurately proxy their families' wealth. Boxes display the distribution of the difference between husband and wife acreage, in absolute value. Larger differences represent higher miss-match, and thus a lower degree of marital sorting in landholdings. The first adjacent line is the lower adjacent value of the distribution. The bottom and top of the box stand for the 25th and 75th percentile, respectively. The central line is the median. The upper adjacent value is indicated by the second adjacent line. Outside values are excluded.

Figure 12: The effects of Queen Victoria's mourning period on the distance between spouses' seats



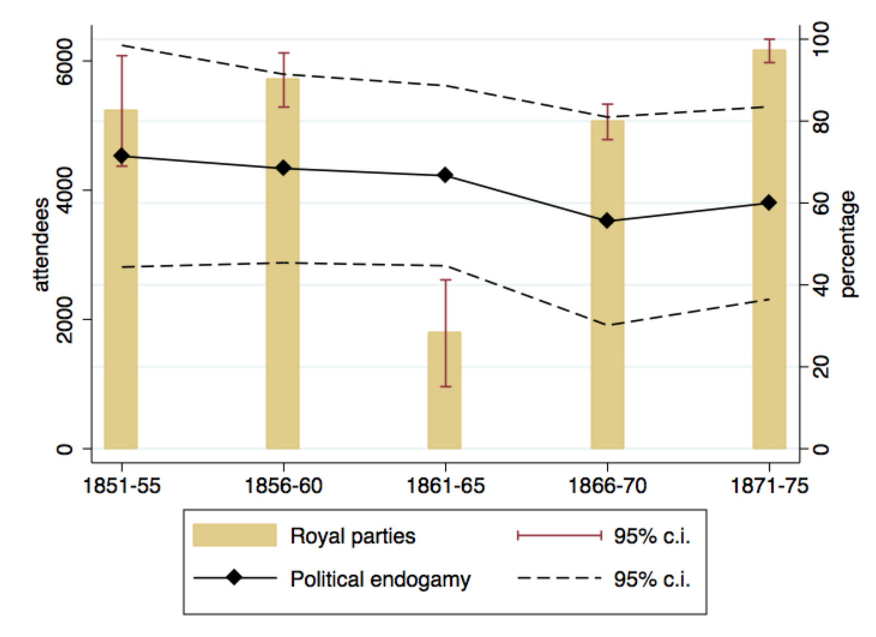
Note: Shaded bars show the number of attendees at royal parties per year (left axis). Royal parties were interrupted in 1861–63 due to Queen Victoria's mourning. The sample for the connected line are all 57 marriages in 1859–66 for which I could locate the family seats of both spouses. By construction, only marriages in which both spouses were peers or peers' offspring are included. The year 1867 is excluded because the distance between spouses' seats could only be calculated for 4 marriages and thus was not representative.

Figure 13: Political endogamy and the London Season



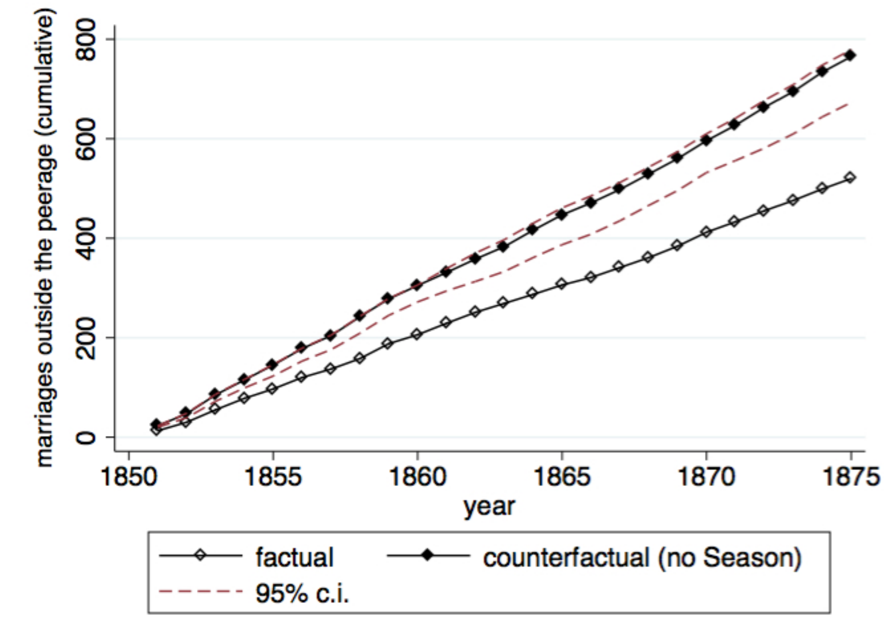
Note: Shaded bars show the number of attendees at royal parties per year (left axis). Royal parties were interrupted from 1861 to 1863 due to Queen Victoria's mourning. For the connected line, the sample is all 276 peers' daughters first marrying in 1859–67. Diamonds display the rate of intermarriage with commoners for women above an age threshold relative to women below the cutoff (right axis). Each panel considers a different age threshold.

Figure 14: Political endogamy and the London Season



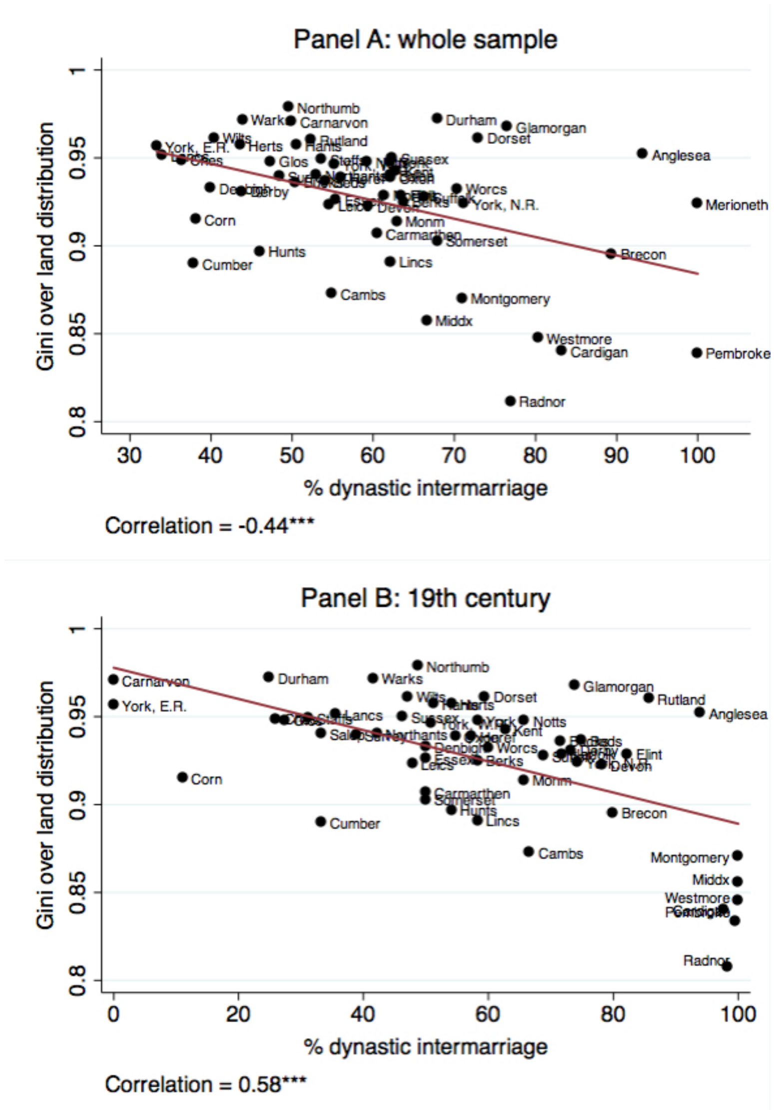
Note: Shaded bars show the number of attendees at royal parties over 5-year intervals (left axis). For the connected line, the sample is all 92 peers who (1) married in 1851–75, (2) were listed by Bateman (1883) as great landowners, (3) belonged to a political club, and (4) married a wife who had a relative in a political club. Diamonds display the percentage of them who married a wife from a family with a similar political ideology (right axis). Political preferences are based on club membership: individuals belonging to Brook's, Reform, or Devonshire are labeled liberals; those in Carlton, Junior Carlton, Conservative, or St. Stephen's are considered tories. This categorization is taken from Bateman's *Great Landowners* (1883: p. 497).

Figure 15: Marrying outside the peerage without the Season



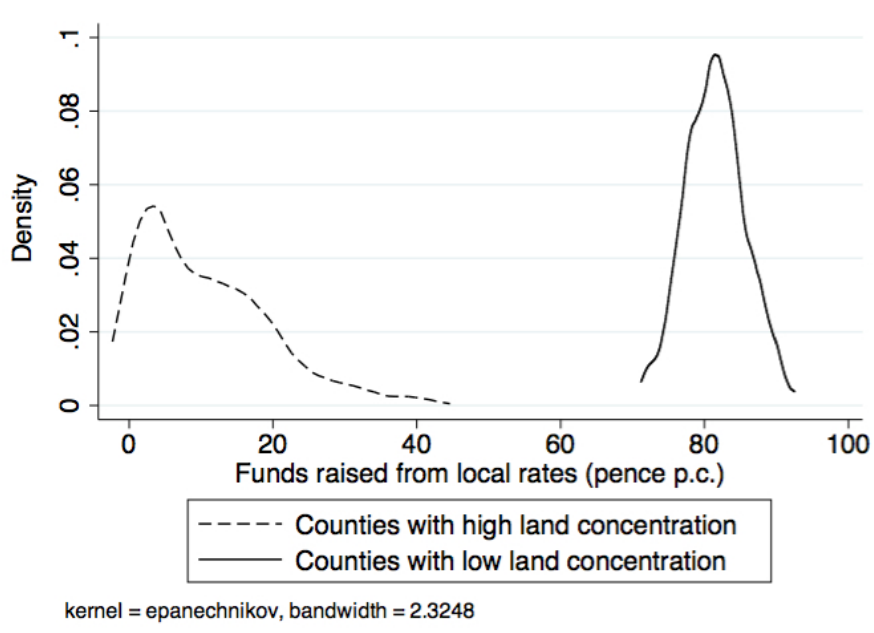
Note: The diamond line plots the cumulative number of peers' daughters who would have married commoners if the Season had not existed in 1851–75. The counterfactual probability of marrying outside the peerage is predicted using the estimated coefficients from Table 7, Panel A (IV probit for women). I set the number of attendees to royal parties to zero and the values of the remaining variables at their yearly means. This probability is then multiplied by the number of marriages per year, which is assumed to be fixed. This gives me the counterfactual number of marriages outside the peerage. The 95% confidence intervals are calculated analogously. Finally, the hollow diamond line displays the actual number of peers' daughters marrying commoners.

Figure 16: Sorting and inequality



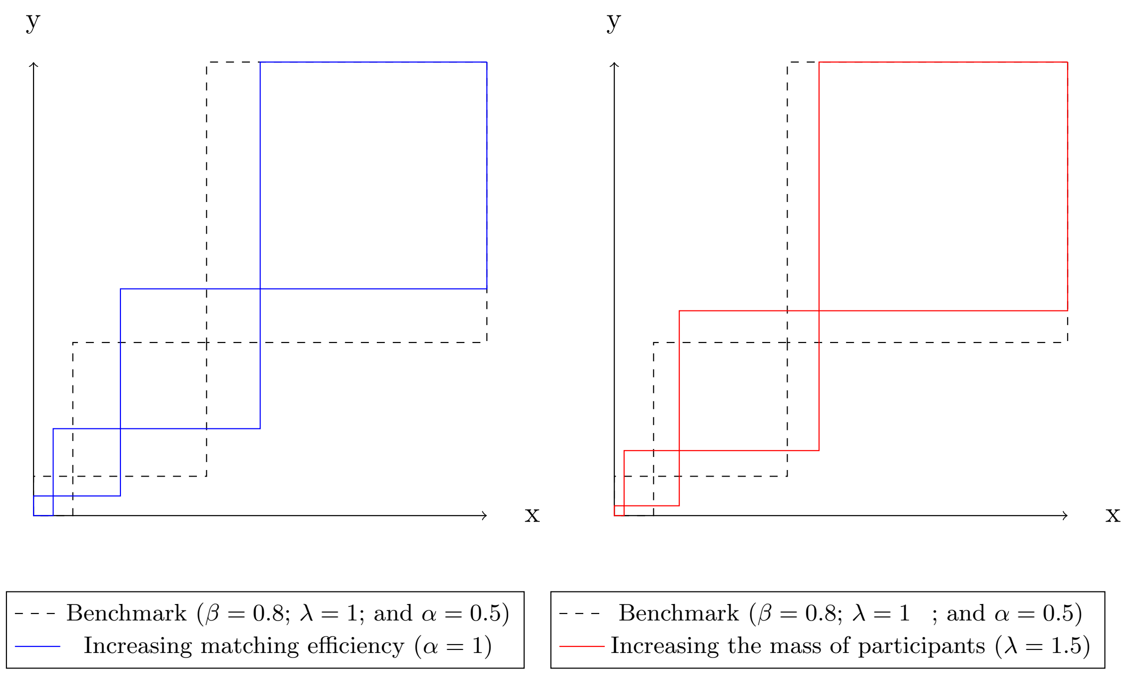
Note: The sample comprises all counties in England and Wales. Dynastic intermarriage is defined as the percentage of members of a noble dynasty that first married a commoner. In Panel A, this percentage is computed from the origins of the dynasty to the date of the marriage of the dynasty member listed in Bateman's *Great Landowners* (1883). In Panel B, only nineteenth-century marriages are considered. In both cases heirs are excluded to avoid the endogeneity that might arise if they marry strategically to consolidate larger estates (Mingay 1963). Each dynasty is assigned to the county in England and Wales in which it held the most land. Dynasties in Yorkshire are assigned to East, West, and North Riding when possible. Bateman did not always specify the Riding in which estates were located. For these cases, I consider the dynasty to be in Yorkshire. The county-level percentage of dynastic intermarriage is the average for all dynasties in that county. The Gini coefficient is defined as the distribution of land at the county level. This comes from Bateman's *Great Landowners* (1883), which for each county presents the number of acres owned by seven groups of landowners: large landowners, 3,000 acres and upwards, broken down by status (commoners vs. peers); squires, estates between 1,000 and 3,000 acres; greater yeomen, between 300 and 1,000 acres; lesser yeomen, between 100 and 300; small proprietors, over 1 acre and under 100; and finally, cottagers, less than 1 acre. Waste and land owned by public bodies is excluded; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Figure 17: Kernel density for investments in education



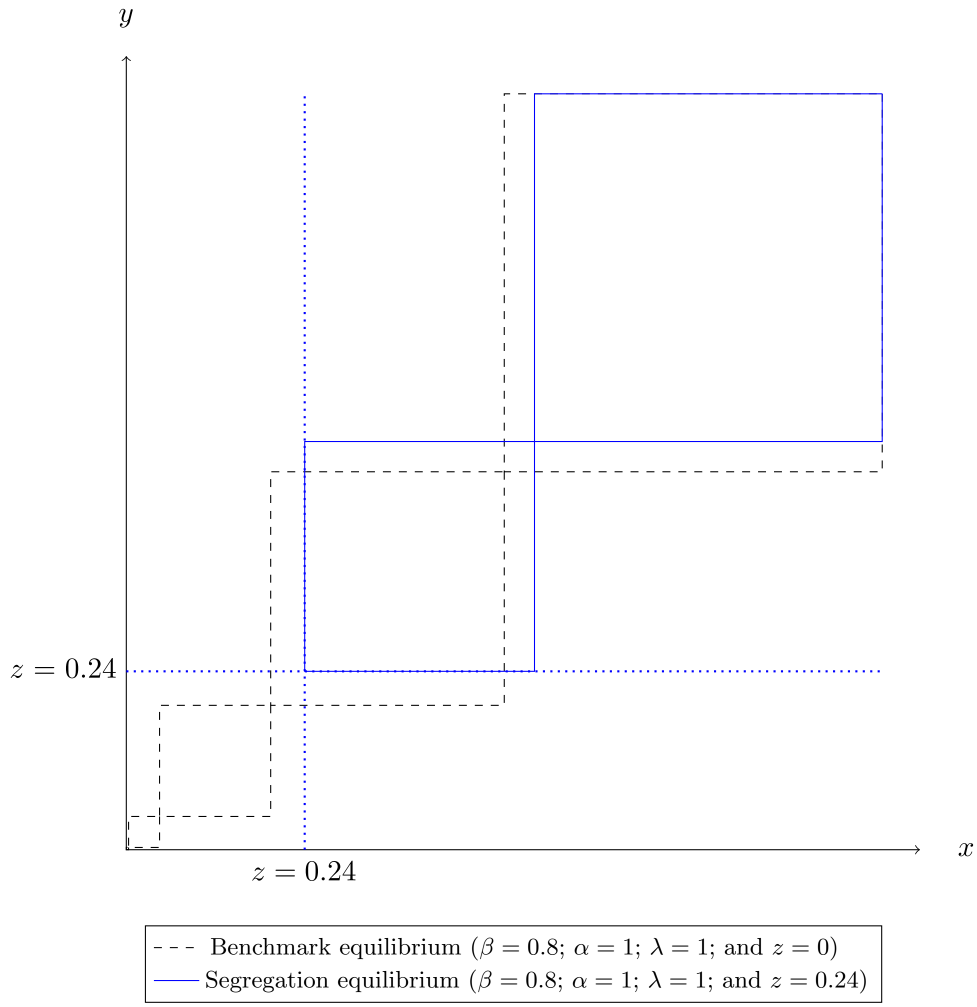
Source: Goñi (2013)
Note: The sample is all counties in England and Wales over 1871–72 and 1894–95 (excluding 1878–79, 1887–88, 1889–90, and 1892–93, for which I do not have any report from the Committee of Council on Education). Counties are divided into two groups: those with high (above median) and low (below median) land concentration. Land concentration is measured as the share of a county that is owned by large landowners, defined as those owning at least 3,000 acres. The chart plots the kernel density function of funds raised from rates, the major source of income for School Boards, for the two sets of counties. To calculate the kernel density estimate, I use the Epanechnikov kernel with a 2.3248 width.

Figure 18: Increasing efficiency of the matching technology



Note: Simulation of the search equilibrium defined in Proposition 1. In this simple example, populations are symmetric $\lambda^m = \lambda^w = \lambda$ and socio-economic status is uniformly distributed on $[0, 1]$, i.e., $F(x) = G(x) = x$. The matching function is defined by $M(\lambda) = \lambda^2$ such that the encounter probability $\frac{\alpha M(\lambda)}{\lambda} = \alpha\lambda$ displays increasing returns to scale. The resulting equilibrium classes are defined by $a^0 = 1$, $a^n = a^{n-1} - \frac{\sqrt{1-\beta}}{\beta\alpha\lambda}\left(\sqrt{1-\beta+2\beta\alpha\lambda a^{n-1}} - \sqrt{1-\beta}\right)$. In the left panel, the class partition equilibrium is simulated for some benchmark parameters ($\beta = 0.8$, $\alpha = 0.5$, and $\lambda = 1$) and for an increased matching efficiency ($\beta = 0.8$, $\alpha = 1$, and $\lambda = 1$). The right panel simulates the benchmark equilibrium against an equilibrium with a larger mass of participants ($\beta = 0.8$, $\alpha = 0.5$, and $\lambda = 1.5$).

Figure 19: Segregation in the marriage market



Note: Simulation of the equilibrium in the exclusive marriage market when a matchmaker can induce segregation by imposing a participation fee p. In this simple example, populations are symmetric $\lambda^m = \lambda^w = \lambda = 1$, and socio-economic status is uniformly distributed on $[0,1]$, i.e., $F(x) = G(x) = x$. The matching function is defined by $M(\lambda) = \lambda^{1.1}$ such that it displays increasing returns to scale, but matched agents do not increase too fast with respect to the measure of agents, i.e., $2\alpha\frac{M(\lambda)}{\lambda} \geq \alpha M'(\lambda) > \alpha\frac{M(\lambda)}{\lambda}$. The resulting equilibrium classes in the exclusive marriage market are defined by $\tilde{a}^0 = 1$, $\tilde{a}^n = \tilde{a}^{n-1} - \frac{(1-z)^2\sqrt{1-\beta}}{\beta\alpha M(1-z)}\left(\sqrt{1-\beta+2\frac{\beta\alpha M(1-z)}{(1-z)^2}\tilde{a}^{n-1}} - \sqrt{1-\beta}\right)$. This class partition equilibrium is simulated for some benchmark parameters ($\beta = 0.8$, $\alpha = 1$, $\lambda = 1$, and $z = 0$) and for a segregation equilibrium in which singles at the bottom quartile of the distribution are excluded ($z = 0.24$).

Table 1: Marriage outcomes for men (1801–1875)

	Wife parental rank						
Husband rank at age 15	*Foreigner*	*Commoner*	*Knight*	*Baronet*	*Baron*	*Duke*	N
Commoner at 15	4.7	64.8	2.7	5.2	9.2	13.4	403
	4.5	*57.3*	*3.0*	*8.4*	*8.9*	*17.9*	
	0.2	7.4***	-0.3	-3.2**	0.3	-4.5**	
Baron son†	5.2	66.0	2.2	9.5	7.8	9.4	758
	4.5	*57.3*	*3.0*	*8.4*	*8.9*	*17.9*	
	0.6	8.6***	-0.8	1.1	-1.1	-8.5***	
Duke son†	4.8	57.7	3.6	9.0	7.3	17.6	752
	4.5	*57.4*	*3.0*	*8.4*	*8.9*	*17.9*	
	0.3	0.4	0.6	0.7	-1.6*	-0.3	
Baron heir	2.9	49.0	3.3	10.1	13.7	20.9	306
	4.5	*57.4*	*3.0*	*8.4*	*8.9*	*17.9*	
	-1.6	-8.3***	0.3	1.8	4.8***	3.0	
Duke heir	3.7	36.8	3.4	6.6	10.3	39.3	351
	4.5	*57.4*	*3.0*	*8.4*	*8.9*	*17.9*	
	-0.8	-20.6 ***	0.4	-1.8	1.3	21.4***	
N	116	1,474	77	215	229	459	2,570
Cross tabulation statistics				Pearson Chi squared (20)	197.119	Pr=0.00	
				Cramer's V	0.1385		
				Gamma test	0.2457	ASE=0.024	
				Kendall's tau-b	0.1724	ASE=0.017	

Note: The sample is all 2,570 peers and peers' sons marrying for the first time in 1801–75. The raw variable is the husband's rank at age 15. Since the sample only considers peers and peer sons, "Commoners at 15" were "pure" commoners at this age but ended their lives holding a peerage (either by creation or by inheriting a distant relative's title). "Baron" stands for baronies and viscountcies, and "Duke" for dukedoms, earldoms, and marquisates. The column variable is the rank of the wife's father. Each cell contains observed percentages, expected percentages if matching was random in italics, and the difference below. The Pearson's chi-squared statistic tests the hypothesis that rows and columns are independent. Cramer's V evaluates the strength of the relation on a 0–1 scale. Kendall's tau-b and the Gamma test assess the direction of the relationship.
*** p<0.01, ** p<0.05, * p<0.1
†excludes heirs

Table 2: Marriage outcomes for women (1801–1875)

	Husband's rank at age 15								
Wife parental rank	*Foreigner*	*Commoner*	*Baron son*	*Duke son*	*Knight*	*Baronet*	*Baron heir*	*Duke heir*	N
Baron daughter	3.3	59.5	2.9	3.7	4.4	8.3	10.2	7.7	1037
	3.2	*50.8*	*2.7*	*5.6*	*3.5*	*8.6*	*11.4*	14.2	
	0.0	8.7***	0.1	-1.9***	0.9**	-0.3	-1.1	-6.5***	
Duke daughter	3.2	42.9	2.6	7.3	2.7	8.8	12.4	20.1	1148
	3.2	*50.8*	*2.7*	*5.6*	*3.5*	*8.6*	*11.4*	14.2	
	0.0	-7.9***	-0.1	1.7***	-0.8**	0.2	1.0	5.9***	
N	71	1,109	60	122	77	187	248	311	2,185
Cross tabulation statistics					Pearson Chi squared (20)		108.869	Pr=0.00	
					Cramer's V	0.2232			
					Gamma test	0.2768	ASE=0.031		
					Kendall's tau-b	0.1649	ASE=0.019		

Note: The sample is all 2,185 peers' daughters who married for the first time in 1801–75. The raw variable is the wife's parental rank. The column variable is the husband's rank at age 15. In contrast to Table 1, the "Commoner" category includes both pure commoners and individuals who were commoners at age 15 but ended their lives holding a peerage. "Baron" stands for baronies and viscountcies, and "Duke" for dukedoms, earldoms, and marquisates. Each cell contains observed percentages, expected percentages if matching was random in italics, and the difference below. The Pearson's chi-squared statistic tests the hypothesis that rows and columns are independent. Cramer's V evaluates the strength of the relation on a 0–1 scale. Kendall's tau-b and the Gamma test assess the direction of the relationship.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Marriage outcomes of "old" families (1814†–75).

	Old family		
	No	Yes	difference
% marrying outside the peerage	59.3	49.5	9.8**
	(2.7)	(4.8)	(5.4)
% marrying a duke daughter	26.9	33.9	-7.0*
	(2.4)	(4.6)	(4.9)
N	334	109	

Note: The sample includes all 443 peers and peers' whose first marriage took place in 1801–75 and who were listed by Bateman (1883) as great landowners. The sample is split according to how old the family name is. A name is "old" if the family (or a junior branch of it) held land in England since the time of Henry VIIl (from Shirley's *Noble and Gentle Men of England*).

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

†For this sample, the earliest marriage recorded took place in 1814.

Table 4: Sorting by acreage for great landowners (1838–75)†

Husband's acres	Wife's family acres: *Not great landowner*	*2,000-6,000*	*6,000-10,000*	*10,000-20,000*	*20,000-50,000*	*50,000-100,000*	*100,000 or more*	N
2,000-6,000	45.4	16.5	9.3	8.3	15.5	4.1	1.0	97
	35.5	*12.1*	*7.1*	*15.7*	*19.8*	*7.3*	*2.6*	
	9.9**	4.4	2.2	-7.4**	-4.3	-3.2	-1.5	
6,000-10,000	44.3	14.3	4.3	17.1	14.3	2.9	2.9	70
	35.4	*12.0*	*7.1*	*15.7*	*19.7*	*7.3*	*2.6*	
	8.9*	2.3	-2.9	1.4	-5.4	-4.4	0.3	
10,000-20,000	29.4	12.7	8.7	19.1	19.1	7.1	4.0	126
	35.5	*12.1*	*7.1*	*15.7*	*19.8*	*7.3*	*2.6*	
	-6.1*	0.6	1.7	3.3	-0.7	-0.2	1.4	
20,000-50,000	35.6	8.5	6.8	17.0	22.9	8.5	0.9	118
	35.5	*12.0*	*7.1*	*15.7*	*19.7*	*7.3*	*2.5*	
	0.1	-3.6	-0.3	1.3	3.1	1.2	-1.7	
50,000-100,000	19.4	9.7	3.2	9.7	41.9	12.9	3.2	31
	35.5	*11.9*	*7.1*	*15.8*	*19.7*	*7.4*	*2.6*	
	-16.1*	-2.3	-3.9	-6.1	22.3***	5.5	0.6	
100,000 or more	21.7	4.4	4.4	26.1	13.0	21.7	8.7	23
	35.7	*12.2*	*7.0*	*15.7*	*20.0*	*7.4*	*2.6*	
	-13.9	-7.8	-2.6	10.4	-7.0	14.3***	6.1*	
N	165	56	33	73	92	34	12	465

Cross tabulation statistics		
	Pearson Chi squared (30) = 51.91	Pr=.008
	Gamma test = 0.21	ASE=.046
	Kendall's tau-b = 0.17	ASE=.037

Note: The sample is all 465 peers and peers' sons who first married in 1838–75 and were listed in Bateman (1883) as great landowners, i.e., they were in possession of more than 2,000 acres, worth £3,000 a year by 1876. The row variable is its acreage, divided into six classes according to Bateman's categorization (Bateman 1883: p. 495). The column variable stands for the landholdings of any wife's relative. "Not a great landowner" includes landless families as well as those in possession of less than 2,000 acres and thus not reported by Bateman. The diagonal representing perfect assortative matching is highlighted in green. Each cell contains observed percentages at the top, expected percentages if matching was random in italics, and the difference between the two below. Boxes are drawn around significant deviations. The Pearson's chi-squared statistic tests the hypothesis that rows and columns are independent. Cramer's V evaluates the strength of the relation on a 0–1 scale. Kendall's tau-b and the Gamma test assess the direction of the relationship.
*** p<0.01, ** p<0.05, * p<0.1
†The earliest marriage recorded in Bateman's *Great Landowners* took place in 1838.

Table 5: Sorting by land rents for great landowners (1838–75)†

Husband land rents (£)	Wife's family land rents (£)							N
	Not great landowner	*2,000-6,000*	*6,000-10,000*	*10,000-20,000*	*20,000-50,000*	*50,000-100,000*	*100,000 or more*	
2,000-6,000	45.4	16.5	9.3	8.3	15.5	4.1	1.0	65
	35.5	*7.7*	*8.8*	*16.2*	*22.3*	*6.5*	*3.1*	
	9.8***	8.8	0.5	-7.9**	-6.8	-2.3	-2.0	
6,000-10,000	44.3	14.3	4.3	17.1	14.3	2.9	2.9	82
	35.5	*7.7*	*8.8*	*16.1*	*22.3*	*6.5*	*3.0*	
	8.8	6.6***	-4.5	1.0	-8.0*	-3.6*	-0.2	
10,000-20,000	29.4	12.7	8.7	19.1	19.1	7.1	4.0	141
	35.5	*7.7*	*8.8*	*16.1*	*22.3*	*6.5*	*3.0*	
	-6.1	5.0	-0.1	3.0	-3.3**	0.7	1.0	
20,000-50,000	35.6	8.5	6.8	17.0	22.9	8.5	0.9	132
	35.5	*7.7*	*8.8*	*16.1*	*22.3*	*6.4*	*3.0*	
	0.1**	0.7**	-2.0	0.8	0.5**	2.0	-2.2	
50,000-100,000	19.4	9.7	3.2	9.7	41.9	12.9	3.2	33
	35.5	*7.9*	*8.8*	*16.1*	*22.4*	*6.4*	*3.0*	
	-16.1**	1.8	-5.6	-6.4	19.5***	6.5	0.2**	
100,000 or more	21.7	4.4	4.4	26.1	13.0	21.7	8.7	12
	35.8	*7.5*	*9.2*	*15.8*	*22.5*	*6.7*	*3.3*	
	-14.1	-3.2	-4.8	10.3	-9.5	15.1	5.4	
N	165	36	41	75	104	30	14	465
Cross tabulation statistics					Pearson Chi squared (30) = 61.93		Pr=.001	
					Gamma test = 0.28		ASE=.046	
					Kendall's tau-b = 0.22		ASE=.036	

Note: The sample is all 465 peers who first married in 1838–75 and were listed by Bateman (1883) as great landowners, i.e., they were in possession of more than 2,000 acres, worth £3,000 a year by 1876. The row variable is their gross annual rents from land, divided into six classes according to Bateman's categorization (Bateman 1883: p. 495). The column variable stands for the land rents of any wife's relative. "Not a great landowner" includes landless families as well as those in possession of less than 2,000 acres and thus not reported by Bateman. The diagonal representing perfect assortative matching is highlighted in green. Each cell contains observed percentages at the top, expected percentages if matching was random in italics, and the difference between the two below. The Pearson's chi-squared statistic tests the hypothesis that rows and columns are independent. Cramer's V evaluates the strength of the relation on a 0–1 scale. Kendall's tau-b and the Gamma test assess the direction of the relationship.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

†The earliest marriage recorded in Bateman's *Great Landowners* took place in 1838.

Table 6: Geographic endogamy by social group (1801–75)

	Men		Women	
	Marrying in the same region [%]	Distance btw. seats [mi.]	Marrying in the same region [%]	Distance btw. seats [mi.]
Commoner at age 15	30	146.7 (130.6)		
Baron's son / daughter	16.2	140.8 (109.2)	28.7	125.2 (104.1)
Duke's son / daughter	28.1	129.1 (109.3)	21	147.1 (115.2)
Baron heir	22.8	135.1 (100.3)		
Duke heir	16.8	157.4 (114.5)		
Total	22.13	142 (111.5)	23	141.4 (112.6)

Note: The sample includes all peers' and peer offspring first marrying in 1801–75 for whom I could locate both spouses' family seats using Burke's *Heraldic Dictionary*. Only marriages where both spouses' families are in the peerage are included. The sample is broken down by social status at age 15. Since the sample only considers peers and peer offspring, "Commoners at 15" are individuals who were "pure" commoners at this age but ended their lives holding a peerage. "Baron" stands for baronies and viscountcies, and "Duke" for dukedoms, earldoms, and marquisates. Distance between spouses' seats is calculated using Vincenty's algorithm. When one or both spouses have more than one seat, I take the minimum distance. Regions are NUTS 1 divisions for England, Scottish Parliament electoral regions, the four provinces of Ireland, and Wales. Standard deviations are in parentheses.

Table 7: The Season and sorting by social position (1851–75)

	Women		Men	
	probit	IV probit	probit	IV probit
	(1)	(2)	(3)	(4)
Panel A: Regressions of % marrying outside the peerage				
Attendees at royal parties (100's)	-0.0035***	-0.0040***	-0.0023*	-0.0020
	(0.0013)	(0.0015)	(0.0014)	(0.0020)
Commoner at age 15			0.03	0.03
			(0.10)	(0.10)
Baron son			0.29***	0.29***
			(0.03)	(0.03)
Duke son			0.22***	0.22***
			(0.03)	(0.03)
Baron heir / daughter	0.23***	0.23***	0.13***	0.13***
	(0.03)	(0.03)	(0.03)	(0.03)
Duke heir / daughter	ref.		ref.	
Relative size of class	-0.93	-0.93	-0.81***	-0.81***
	(0.68)	(0.68)	(0.28)	(0.28)
Age at marriage	0.02***	0.02***	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Peerage of England & Wales	-0.09**	-0.09**	-0.08***	-0.08***
	(0.04)	(0.04)	(0.03)	(0.03)
Peerage of Ireland / Scotland	ref.		ref.	
Sex ratio (men / women)	-0.52	-0.57	-0.22	-0.19
	(0.33)	(0.35)	(0.20)	(0.24)
Railway length (100 mi.)	0.00	0.01	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Decade fixed effects and trend	yes	yes	yes	yes
Observations	796	796	993	993
% correctly predicted	68.8	69.3	75.0	70.0
Sargan test	1.33 (p = 0.51)		3.01 (p = 0.22)	
Panel B: First stage for attendees at royal parties (100's)				
Marriageable cohort size	-	67.36**	-	67.36**
		(28.05)		(28.05)
Queen Victoria's mourning (1861–63)	-	-3,117***	-	-3,117***
		(906.71)		(906.71)
Crystal Palace fair (1851)	-	3,168***	-	3,168***
		(803.50)		(803.50)
Sex ratio (men/women)	-	131.1	-	131.1
		(4,237)		(4,237)
Railway length (100 mi.)	-	1.253	-	1.253
		(1.06)		(1.06)
Decade fixed effects and trend	-	yes	-	yes
Observations	-	25	-	25
F-test	-	20.89	-	20.89

Note: The sample for Panel A is all peers and peers' offspring first marrying in 1851–75. The columns report marginal effects at the mean. The variable capturing the effect of the Season is the number of attendees at royal parties. "Commoners at 15" were commoners at this age but ended their lives holding a peerage. "Baron" stands for baron and viscounts; and "Duke" for duke, earl, and marquis. For each individual, the relative size of class is the percentage of people of the opposite sex aged ± 2 years her own age who belong to the same class. Sex ratio is the ratio of peers and peer sons aged 19–25 to peers' daughters aged 18–24. For years when the latter is underreported, I estimate the number of girls to be 0.95× men. The length of the railway network is from Mitchell (1988, Ch.10, Table 5). Standard errors clustered by year are in parentheses. For Panel B, the sample is the years 1851–75. Constants are not reported. Standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 8: The Season and sorting by landholdings (1851–75)

Regressions of % marrying in the same class in terms of acreage

	same "Bateman class"		same decile, ± one decile	
	probit	IVprobit	probit	IVprobit
	(1)	(2)	(3)	(4)
Attendees at royal parties (100's)	0.005***	0.007***	0.004**	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
Acres (1000's)	0.001	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Relative size of land class	0.335	0.331	0.110	0.116
	(0.366)	(0.364)	(0.398)	(0.396)
Age at marriage	0.003	0.003	-0.002	-0.002
	(0.003)	(0.003)	(0.005)	(0.005)
Peerage of England & Wales	0.128***	0.129***	0.078*	0.077*
	(0.042)	(0.042)	(0.041)	(0.041)
Peerage of Ireland / Scotland	ref.		ref.	
Sex ratio (men / women)	0.162	0.348	-0.150	-0.228
	(0.489)	(0.518)	(0.512)	(0.531)
Railway length (100 mi.)	-0.034***	-0.039***	-0.025*	-0.023*
	(0.013)	(0.015)	(0.014)	(0.013)
Decade fixed effects and trend	yes	yes	yes	yes
Observations	257	257	257	257
% Correctly predicted	82.1	82.1	75.9	75.9
Sargan test		1.13 (p = 0.30)		0.39 (p = 0.54)

Regressions of % marrying in the same class in terms of land rents

	same "Bateman class"		same decile, ± one decile	
	probit	IVprobit	probit	IVprobit
	(1)	(2)	(3)	(4)
Attendees at royal parties (100's)	0.003*	0.003	0.005***	0.006***
	(0.002)	(0.003)	(0.002)	(0.002)
Land rents (1000's)	0.001	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Relative size of land class	0.788***	0.783***	0.690*	0.691*
	(0.238)	(0.238)	(0.362)	(0.359)
Age at marriage	-0.006	-0.006	-0.006	-0.007
	(0.005)	(0.005)	(0.004)	(0.004)
Peerage of England & Wales	0.143***	0.142***	0.027	0.028
	(0.052)	(0.052)	(0.052)	(0.052)
Peerage of Ireland / Scotland	ref.		ref.	
Sex ratio (men / women)	-0.637	-0.639	0.734	0.896*
	(0.401)	(0.415)	(0.488)	(0.539)
Railway length (100 mi.)	-0.029**	-0.029*	-0.022**	-0.027***
	(0.013)	(0.015)	(0.011)	(0.010)
Decade fixed effects and trend	yes	yes	yes	yes
Observations	257	257	257	257
% Correctly predicted	80.5	80.9	76.7	76.7
Sargan test		0.11 (p = 0.74)		2.45 (p = 0.13)

Note: The sample comprises all peers and peers' sons first marrying in 1851–75 and listed in Bateman (1883), i.e., they were in possession of more than 2,000 acres, worth £3,000 a year by 1876. Each column reports marginal effects at the mean. The percentage marrying in the same "Bateman class" corresponds to the highlighted diagonal in Tables 4 and 5. Land classes are also defined in terms of deciles. The effect of the Season is captured by the number of attendees at royal parties. For each great lord, the "relative size of land class" is the percentage of women aged 18–24 belonging to his same land class. Sex ratio is estimated as peers and peer sons aged 19–25 to peers' daughters aged 18–24. For years when the latter is underreported, I estimate the number of girls to be 0.95× men. The length of the railway network comes from Mitchell (1988, Ch.10, Table 5). IV probit uses the first stage reported in Table 7, Panel B. Standard errors clustered by year in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 9: Regressions of socio-economic homogamy

	SES pizazz calculated over 1851–75		SES pizazz calculated over 5-year cohorts	
	OLS (1)	IV (2)	OLS (3)	IV (4)
Attendees at royal parties (100's)	-21.2**	-21.8**	-17.1**	-17.9*
	(8.4)	(10.9)	(8.1)	(10.3)
Commoner at age 15	-859.7	-861.7	-837.3	-839.5
	(876.4)	(844.2)	(859.2)	(828.0)
Baron son	719.8	718.3	652.1	650.3
	(487.6)	(468.7)	(476.3)	(458.1)
Duke son	1,148.8*	1,149.9**	1,141.2*	1,142.5**
	(607.5)	(585.9)	(586.3)	(565.1)
Baron heir	157.7	159.6	130.8	133.0
	(396.9)	(388.4)	(392.8)	(383.6)
Duke heir	ref.	ref.	ref.	ref.
Acreage	-9.8**	-9.8**	-9.7**	-9.7**
	(4.1)	(4.0)	(3.9)	(3.9)
Land rents	1.9	1.9	2.1	2.0
	(9.7)	(9.3)	(9.5)	(9.2)
Relative size of social class	-4,292.4*	-4,291.7*	-4,253.9*	-4,253.0*
	(2,393.2)	(2,313.7)	(2,350.4)	(2,272.4)
Relative size of acreage class	422.1	422.4	603.7	604.1
	(1,987.9)	(1,921.2)	(1,952.3)	(1,887.2)
Relative size of rents class	-471.3	-473.7	-499.1	-501.9
	(1,452.1)	(1,398.3)	(1,453.5)	(1,398.6)
Age at marriage	-10.0	-9.9	-7.1	-6.9
	(24.9)	(23.7)	(24.6)	(23.4)
Peerage of England & Wales	-649.0	-649.6	-687.1	-687.8*
	(421.3)	(406.3)	(411.6)	(397.0)
Peerage of Ireland / Scotland	ref.	ref.	ref.	ref.
Sex ratio (men / women)	4,336.6	4,255.9	5,270.3	5,176.4
	(3,860.6)	(3,922.3)	(3,835.5)	(3,909.6)
Railway length (100 mi.)	172.1*	173.9**	157.1*	159.2*
	(89.1)	(87.7)	(86.1)	(84.1)
Constant	181,567	183,494*	165,222.6	167,464.5
	(110,891)	(108,522)	(107,351.0)	(104,427.9)
Decade fixed effects and trend	yes	yes	yes	yes
Observations	993	993	993	993
Sargan test		0.463		0.638
		(p = 0.79)		(p = 0.73)

Note: IV probit uses the first stage reported in Table 7 Panel B.
Note (2): The sample includes all peers and peers' sons first marrying in 1851–75. The dependent variable measures the distance between the spouses' socio-economic pizazz. I rank all the husbands and wives in the sample according to the following lexicographic order: (1) land rents (percentile), (2) acreage (percentile), and (3) social position. Within social position, duke heirs are on top, followed by baron heirs, duke sons, baron sons, baronets, and commoners at age 15. For women, duke daughters are followed by baron daughters, and commoner daughters. The pizazz index is calculated over the whole sample (1851–75), and over 5-year cohorts (1850–55 to 1870–75). Homogamy is then defined as the squared difference between spouses' indexes. The index is calculated under the assumption that spouses of peers not listed in Bateman's *Great Landowners* belong to families also not listed in the book. In other words, smaller values stand for spouses who are closer in terms of socio-economic pizazz. The variable capturing the effect of the Season on homogamy is the number of attendees at royal parties (in hundreds of guests). The remaining independent variables are described in Table 7 and Table 8, columns (1) and (2). Standard errors clustered by year are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 10: The Season and geographic endogamy (1851–75)

	Regressions of distance (mi.) between spouses' seats	
	OLS	IV
	(1)	(2)
Attendees at royal parties (100's)	0.70	1.24*
	(0.59)	(0.74)
Commoner at age 15	35.35	38.75
	(43.22)	(41.70)
Baron son	-6.44	-3.95
	(37.59)	(36.31)
Duke son	-62.29***	-63.07***
	(18.09)	(17.92)
Baron heir / daughter	-39.04***	-39.44***
	(13.49)	(13.50)
Duke heir / daughter	ref.	ref.
Seat density	0.91	0.89
	(1.31)	(1.30)
Age at marriage	2.00	1.79
	(1.40)	(1.39)
Woman	-2.74	-3.52
	(10.98)	(10.97)
Peerage of England & Wales	-40.66***	-41.49***
	(9.92)	(10.02)
Peerage of Ireland / Scotland	ref.	ref.
Sex ratio (men / women)	190.35	245.58
	(223.41)	(236.96)
Railway length (100 mi.)	-2.73	-4.09
	(6.47)	(6.52)
Constant	-3,374.11	-4,759.39
	(8,057.72)	(8,108.59)
Decade fixed effects and trend	yes	yes
Observations	351	351
Sargan test		1.35 (p = 0.51)

Note: The sample is all peers and peers' offspring first marrying in 1801–75, for whom I could locate both spouses' family seats using Burke's *Heraldic Dictionary*. Only marriages in which both spouses' families are in the peerage are included. Distance between spouses' seats is calculated using Vincenty's algorithm. When one or both spouses have more than one seat, I take the minimum distance. The variable capturing the effect of the Season on geographic endogamy is the number of attendees at royal parties (in hundreds of guests). "Commoners at 15" were commoners at this age but ended their lives holding a peerage. "Baron" stands for baron and viscount, and "Duke" for duke, earl, and marquis. For each individual, "seat density" is the percentage of people of the opposite sex aged $\pm$ 2 years her age whose family seat is in the same region. Regions are NUTS 1 divisions for England, Scottish Parliament electoral regions, the four provinces of Ireland, and Wales. Sex ratio is estimated as peers and peers' sons aged 19–25 to peers' daughters aged 18–24. For years when the latter is underreported, I estimate the number of girls to be 0.95 $\times$ *men*. The length of the railway network comes from Mitchell (1988, Ch.10, Table 5). IV probit uses the first stage reported in Table 7, Panel B. Standard errors clustered by year are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Balanced cohorts: Mourning versus normal years

	Mourning 1861–63	Normal years 1859–67†	Difference
Demographic characteristics at marriage (women)			
Age at first marriage	24.73	24.36	0.37
	(0.59)	(0.43)	(0.74)
Duke daughters	0.51	0.52	-0.01
	(0.05)	(0.04)	(0.06)
Baron daughters	ref.	ref.	
Peerage of England	0.65	0.59	0.06
	(0.05)	(0.04)	(0.06)
Peerage of Scotland and Ireland	ref.	ref.	
Cohort characteristics			
Female cohort size (18–24)	264	261	3
	(1.93)	(3.06)	(3.46)
Sex ratio (men/women)	1.111	1.107	0.005
	(0.010)	(0.024)	(0.021)

Note: The demographic characteristics are for all 276 peers' daughters first marrying in 1859–67. The sample is then divided into women marrying during Queen Victoria's mourning period (1861–63) and women marrying the years before and after. Age at first marriage is presented in years, "duke daughters" and "peerage of England" in proportions. Cohort characteristics are yearly averages. Female cohort size is the number of peers' daughters aged 18–24. Eighteen was the earliest age at which a girl was presented at court. After 24, the hazard rate for women sharply decreases (see Figure A4 in the appendix). Sex ratio is computed as the number of peers and peer sons aged 19–25 to peers' daughters aged 18–24. For years when the latter is underreported, I estimate the number of girls to be $0.95 \times men$. Standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
†1859–67 excludes the years of the mourning.

Table 12: Sample stratification

		Social status		Acreage		Land rents		SES pizazz	
	Baseline	Heirs	Non-heirs	Above median	Below median	Above median	Below median	Above median	Below median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sorting by acreage	0.007***	0.018***	0.0015	0.010***	0.0035	-	-	-	-
	(0.002)	(0.004)	(0.003)	(0.003)	(0.003)	-	-	-	-
Sorting by land rents	0.005***	0.007	0.003	-	-	0.005	0.006**	-	-
	(0.002)	(0.006)	(0.002)	-	-	(0.004)	(0.003)	-	-
Homogamy	-5.7**	-38.02**	-17.21	-	-	-	-	-22.04**	-1.66
	(2.8)	(19.31)	(15.99)	-	-	-	-	(11.03)	(5.44)
Distance	1.24*	0.41	3.48***	1.13	8.17***	0.79	7.46***	1.08	2.56**
	(0.74)	(0.70)	(1.25)	(0.79)	(2.12)	(0.74)	(1.98)	0.72	(1.00)

Note: This table reports the marginal effects of 100 additional attendees at royal parties on the corresponding marriage outcomes. Each column divides the sample by social status, acreage, gross annual rents from land, and socio-economic pizazz. "Sorting by acreage" is defined as the probability of marrying a spouse in your same land class, as defined by Bateman (1883: p.495). "Sorting by land rents" is the probability of marrying in your same or a contiguous decile of the land rents distribution. "Homogamy" is defined as in Table 9, columns (1) and (2). "Distance" is the miles between spouses' family seats. The sample for each regression is defined in Tables 7–10. Each regression includes the full set of controls reported in Tables 7–10 and uses the first stage reported in Table 7, Panel B. Standard errors clustered by year are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Alternative measures of attendance to the Season

	Number of attendees at		Number of invitations issued for	
	All royal parties (1)	Balls and concerts (2)	All royal parties (3)	Balls and concerts (4)
Marrying outside the peerage (wom)	-0.004***	-0.005***	-0.004***	-0.004***
	(0.002)	(0.001)	(0.002)	(0.002)
Sorting by acreage	0.007***	0.006**	0.006***	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Sorting by land rents	0.005***	0.005***	0.006***	0.005**
	(0.002)	(0.0022)	-0.0019	(0.0021)
Homogamy	-21.8**	-22.0**	-20.9**	-21.1**
	(10.9)	(11.0)	(10.1)	(10.2)
Distance between spouses' seats	1.24*	1.04*	1.15*	0.96
	(0.74)	(0.62)	(0.70)	(0.59)
F-stat from first-stage	20.89	40.99	27.88	46.38

Note: This table reports the marginal effects of 100 additional guests at the Season on the corresponding marriage outcomes. "Marrying outside the peerage" is the probability of peers' daughters marrying a commoner. "Sorting by acreage" is defined as the probability of marrying a spouse in your same land class, as defined by Bateman (1883: p.495). "Sorting by land rents" is the probability of marrying in your same or a contiguous decile of the land rents distribution. "Homogamy" is defined as in Table 9, columns (1) and (2). "Distance" is the miles between spouses' family seats. Each column defines participation in the Season in a different manner. Column (1) reports the results for the baseline definition: number of attendees at royal parties. Column (2) restricts attendance to balls and concerts held at Buckingham or St. James' Palace. Columns (3) and (4) show the corresponding numbers of invitations issued. Regression samples and covariates are reported in Tables 7–10. Standard errors clustered by year are in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 14: Using selection from observables to assess the selection on unobservables

			Sorting by		
		Marrying a commoner	Acreage	Land rents	Homogamy
Controls in the restricted set	Controls in the full set	(1)	(2)	(3)	(4)
None	All	1.20	1.16	4.14	1.11
Time effects	All	1.95	1.48	3.55	1.24
Time effects + cohort controls	All	10.24	3.88	7.56	3.14
Time effects + class controls	All	2.21	3.41	4.14	2.05

Note: Each cell reports ratios based on the coefficients for $Y_{i,t} = \beta\ A_t + \mathbf{X}'_{i,t}\lambda + \mathbf{V}'_t\delta + \epsilon_{i,t}$ from two individual-level linear regressions. $Y_{i,t}$ is the marriage outcome. "Marrying outside the peerage" is the probability of peers' daughters marrying a commoner. "Sorting by acreage" is defined as the probability of marrying a spouse in your same land class, as defined by Bateman (1883: p.495). "Sorting by land rents" is the probability of marrying in your same or a contiguous decile of the land rents distribution. "Homogamy" is defined as in Table 9, columns (1) and (2). A_t is the number of attendees at royal parties (in 100s of guests). In one regression, the covariates $\mathbf{X}_{i,t}$ and $\mathbf{V}_{i,t}$ include the "restricted set" of control variables. Call the coefficient of interest in this "restricted" regression β^R. In the other regression, covariates include the full set of controls. Call the coefficient of interest in this full regressions β^F. The reported ratio is the absolute value of $\beta^F/(\beta^R - \beta^F)$ (Altonji et al. 2005).

Controls and sample: Time effects stand for a linear trend and decade fixed effects. Cohort controls are the sex ratio and the relative size of class as defined in Tables 7–9. Class controls include relative size of class, dummies for social class in columns (1) and (4), total acreage in column (2), land rents in column (3), and both in column (4). The full set of controls and the sample are described in Tables 7, column (1), and in Tables 8 and 9.

Table 15: IV estimates for plausibly exogenous cohort size instrument

	γ=0 (1)	$\gamma = 0.1 \cdot \beta$ (2)	$\gamma = 0.25 \cdot \beta$ (3)	$\gamma = 0.5 \cdot \beta$ (4)	$\gamma = 0.75 \cdot \beta$ (5)
$\hat{\beta}(\gamma)$ for marrying out (wom)	-0.011***	-0.013***	-0.015***	-0.019***	-0.023***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
$\hat{\beta}(\gamma)$ for acreage sorting	0.027***	0.031***	0.037***	0.046***	0.056***
	(0.01)	(0.01)	(0.01)	(0.011)	(0.013)
$\hat{\beta}(\gamma)$ for rents sorting	0.023***	0.026***	0.031***	0.039***	0.047***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.01)
$\hat{\beta}(\gamma)$ for homogamy	-21.8**	-24.92**	-29.5**	-37.2***	-44.9***
	(10.9)	(10.9)	(11.1)	(11.9)	(13.1)
$\hat{\beta}(\gamma)$ for distance	1.225*	1.4*	1.662**	2.01***	2.537***
	(0.725)	(0.736)	(0.758)	(0.81)	(0.878)

Note: This table reports point estimates $\hat{\beta}(\gamma)$ and robust standard errors for the effects of the number of attendees at royal parties on various marriage outcomes. Each column assumes different values for γ, the direct effect of the cohort size instrument on marriage outcomes, i.e., $Y_{i,t} = \beta \hat{A}_t + \mathbf{X}'_{i,t}\lambda + \mathbf{V}'_t\delta + \gamma\ Cohort_t + \epsilon_{i,t}$ in the second stage described in section 5.5. The sample and set of covariates for each regression are as described in Tables 7–10. "Marrying out" is the percentage probability of a peer daughter marrying outside the peerage. "Sorting by acreage" is the percentage probability of marrying in your same land class (defined as in Bateman 1883: p. 495). "Sorting by rents" is the percentage probability of marrying in your same decile or a contiguous decile of the distribution of land rents. Homogamy is the distance between spouses' socio-economic pizazz, as defined in Table 10, columns (3) and (4). Distance is the number of miles between spouses' seats.

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Marriage and political preferences (1817–1875)†

	Wife's family		
Husband	*Liberal club*	*Tory club*	N
Liberal club	39.5	60.5	43
	29.5	70.5	
	10*	-10*	
Tory club	25.3	74.7	99
	29.6	70.4	
	-4.3*	4.3*	
N	42	100	142
Cross tabulation statistics			
Person Chi squared (1)	2.9359	Pr = 0.087	
Cramer's V	0.1438		
Gamma test	0.3187	ASE = 0.174	
Kendall's tau-b	0.1438	ASE = 0.087	

Note: The sample comprises all 142 peers and peers' sons who (1) first married in 1817–75, (2) are listed in Bateman (1883) as great landowners, (3) belonged to a political club, and (4) married a wife who had a relative in a political club. The row variable indicates the husbands' political preferences. The column variable is the political preferences of any wife's relative listed in Bateman (1883). Political preferences are based on club membership. *Liberals* are those belonging to Brook's, Reform, or Devonshire; *Tories* are in Carlton, Junior Carlton, Conservative, or St. Stephen's. The categorization of political clubs is taken from Bateman's *Great Landowners* (1883: p. 497). Each cell contains observed percentages at the top, expected percentages if matching was random in italics, and the difference between the two below. The Pearson's chi-squared statistic tests the hypothesis that rows and columns are independent. Cramer's V evaluates the strength of the relation on a 0–1 scale. Kendall's tau-b and the Gamma test assess the direction of the relationship.

*** p<0.01, ** p<0.05, * p<0.1

†For this sample, the earliest marriage recorded in Bateman's *Great Landowners* took place in 1817.

A Supplemental figures and tables

Table A1: Relation to landowner of matched wives

	Number	Percent	Acreage	Gross annual rents (£)
Panel A: Matched wives				
Sister	154	43.4	62.0	28.0
			(214.9)	(29.5)
Daughter	101	28.5	41.6	25.1
			(141.1)	(28.5)
Aunt	35	9.9	28.9	40.2
			(19.9)	(34.8)
Cousin (second†)	22	6.2	22.4	21.5
			(38.8)	(20.6)
Cousin	18	5.1	24.6	25.4
			(17.8)	(16.9)
Niece	12	3.4	24.9	16.0
			(16.2)	(8.4)
Granddaughter	7	2.0	30.7	23.4
			(28.8)	(18.3)
Aunt (second)	3	0.8	96.7	88.1
			(37.7)	(67.8)
Other	3	0.8	20.2	27.7
			(11.3)	(16.8)
Total	355	100	46,7	27,9
			(161,3)	(29,2)
Panel B: All wives				
Matched	355	42.8		
Not matched	203	57.2		
Total	558	100		

Note: The sample for Panel A is all 355 first wives of peer great landowners who could be matched to Bateman's list of great landowners, i.e., they had a close relative who was recorded as a great landowner. The sample is broken down by family relation. Acreage and gross annual rents from land are in thousands. Standard deviations are in parentheses. For Panel B, the sample includes all first wives of peers and peers' sons in possession of 2,000 acres and upwards by the 1870s.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
† "Second" indicates two generations to the closest common ancestor.

Table A2: Network connections in 1862 marriages

	Number of links		
	with spouse	average	maximum
Panel A: Husbands			
Heir to Earl of Suffolk	2	1	2
Earl of Ellesmere	2	1	2
Sir Ivor Guest	1	0.44	2
Earl Brownlow's son	1	0.44	1
Arthur Smith-Barry	1	1.11	2
Heir to Baron St. John of Bletso	0	0.44	1
Heir to Viscount Elibank	0	0.11	1
Baron Sudeley's son	0	0.56	2
John Rolls	0	0.78	2
Panel B: Wives			
Mary Eleanor	2	1.22	2
Dau, Marquess of Normanby	2	1.11	2
Ellen Georgiana	1	0.22	1
Blanche Alice	1	0.22	1
Dau. Duke of Malborough	1	1.11	2
Dau. Earl Shrewsbury	0	1.00	2
Ada M. Kateherine	0	0.33	2
Dau. Earl of Dunraven and Mount-Earl	0	0.67	2
Dau. Baronet Morvaren	0	0.00	0
Total average	0.78	0.65	1.61

Note: The sample is the 9 peers and peers' sons who married in 1862, together with their spouses. A link is established if the man and the woman's father have the same social status (dukes vs. barons vs. commoners), if their families are in possession of estates of similar size (defined according to Bateman's categorization, p. 497), or if the man and any relative of the woman belong to the same club.
*** p<0.01, ** p<0.05, * p<0.1

Figure A1: Charles Lyttelton, Lord Lyttelton, Cockayne's *Complete Peerage*

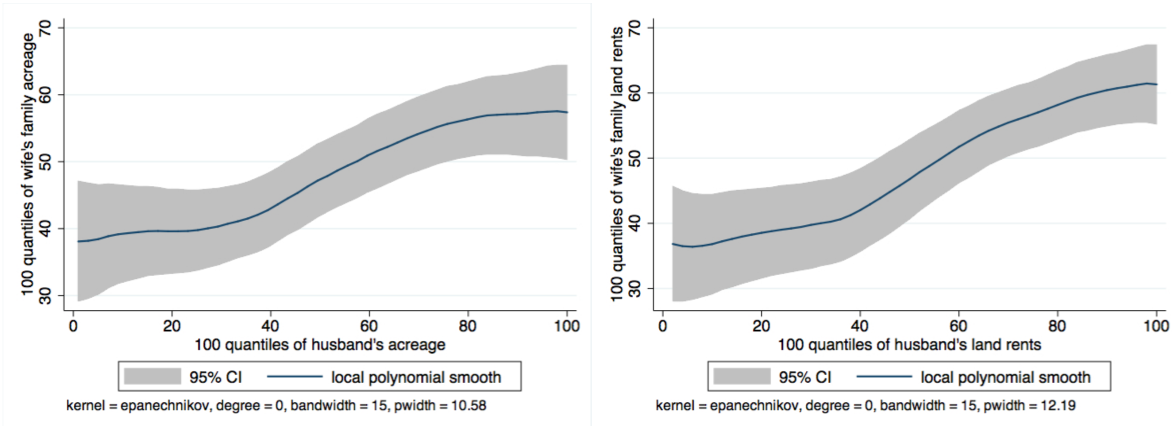
VII. 1876. 5. CHARLES GEORGE (LYTTELTON), LORD LYTTELTON, BARON OF FRANKLEY [1794] also BARON WESTCOTE OF BALLYMORE in the peerage of Ireland [1776] also *a Baronet* [1618], s. and h., by 1st wife, *b.* 27 Oct. 1842; ed. at Eton and at Trin. Coll., Cambridge; M.P. for East Worcestershire, 1868-74: *suc. to the peerage,* 18 April 1876; Land Commr., 1881-89; *suc.* as VISCOUNT COBHAM AND BARON COBHAM, on the death, 26 March 1889, of his distant cousin (the Duke of Buckingham and Chandos, Viscount Cobham, &c.), under the *spec. rem.* in the creation of that dignity, 23 May 1718. He *m.* 19 Oct. 1878, Mary Susan Caroline, 2d da. of William George (CAVENDISH), 2d BARON CHESHAM, by Henrietta Frances, da. of the Rt. Hon. William Saunders Sebright LASCELLES. She was *b.* 19 March 1853.

Figure A2: Charles Lyttelton, Lord Lyttelton, Bateman's *Great Landowners* (1883)

*** LYTTELTON, LORD, Hagley Hall, Stourbridge. S.

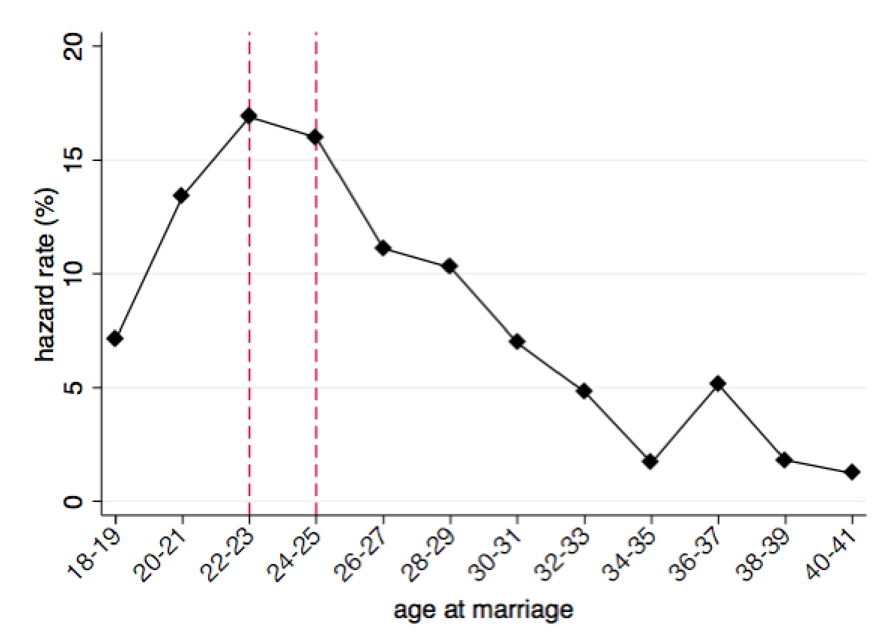
Coll. Eton, Trin. Cam.	Worcester . .	5,907 .	9,170
Club. Brooks's.	Hereford . .	1,032 .	1,093
b. 1842, s. 1876, m. 1878.			
Sat for E. Worcestershire.		6,939 .	10,263

Figure A3: Kernel-weighted local polynomial smoothing: Husband's landholdings on wife's landholdings (1851–75)



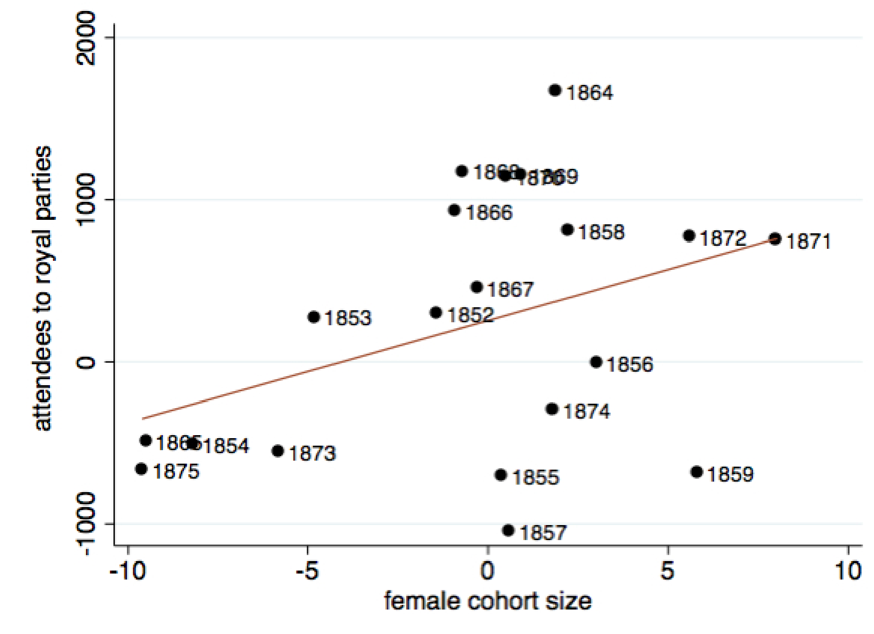
Note: The sample comprises all peers in possession of 2,000 acres and upwards first marrying in 1851–75. The solid line plots a kernel-weighted local polynomial regression of y on x. In the left panel, y and x are wife and husband acreage. In the right panel, y and x stand for land rents. Both variables are presented in percentiles.

Figure A4: Hazard rates for the cohort marrying in 1850–59



Note: The sample is all 466 peers' daughters first marrying in 1850–59. The diamonds show the hazard rates, i.e., the percentage of single women who got married at each age. The 1850–59 cohort is meant to represent the customary marriage patterns before Prince Albert's dead in 1861. I use this evidence to show that in 1861, women younger than 22 could defer their choice of partner but women aged 22 or more (and, thus, 25 or more when the Season resumed in 1864) would be more hard-pressed to marry. The dashed lines indicate that, in fact, for ages 22–23 and 24–25 hazard rates peak and sharply decreasing afterwards.

Figure A5: Relation between cohort size and royal parties



Note: The female cohort size is the number of peers' daughters aged 18–24 each year. Eighteen was the earliest age at which a girl was presented at court. After 24, the hazard rate for women sharply decreases (see Figure A4 in the appendix). Both female cohort size and attendance to royal parties are detrended. The years of Queen Victoria's mourning (1861–63), the Crystal Palace Exhibition (1851), and outliers (1860) are excluded.

B Proofs

This Appendix presents the proofs omitted in the paper.

Proof of Proposition 1.

This proof follows Burdett and Coles (1997) and goes by induction. For the basis step, note that (6.1.2) implies $r(1) < 1$. Similarly, $\rho(1) < 1$. Note also that (6.1.2) equals to a^1 as defined in Proposition 1. All together, this establishes that the most desirable woman ($y = 1$) will propose to any man of type $x \geq r(1)$. As $r(y)$ is nondecreasing, this implies that all women will propose to such men.

Note also that if the most desirable woman ($y = 1$) or man ($x = 1$) is willing to accept an individual, then that individual shares the same reservation strategy as the most desirable of her sex. Consider a man of type $x \in [r(1), 1]$. Since the most desirable woman is willing to marry him, all women will be willing to marry him, and hence $\Omega(1) = 1$ and $G(y|x) = G(y)\ \forall y$. This implies that $\rho(x) = \rho(1)$, as defined in (6.1.2). The same is true for women of type $y \in [\rho(1), 1]$. Redefine $a^1 \equiv r(1)$ and $b^1 \equiv \rho(1)$. It follows clearly that men with $x \in [a^1, 1]$ and women with $y \in [b^1, 1]$ form an endogamic marriage class (class 1), in that agents in this class only marry members of this same class and reject all others.

Assume that for $n - 1$, men with $x \in [a^{n-1}, a^{n-2}]$ and women with $y \in [b^{n-1}, b^{n-2}]$ form an endogamic marriage class (class $n - 1$), in that agents in this class only marry members of this same class, reject individuals of lower type, and are rejected by those in class $n - 2$.

For the inductive step, consider the most desirable women not in class $n - 1$, $y' + \epsilon = b^{n-1}$ for an arbitrarily small $\epsilon > 0$. By the inductive assumption, she is rejected by class $n - 1$ men. However, for all the men with $x < a^{n-1}$, she is the best available suitor. Thus, they all will propose to her. That is, $\Omega(y') = F(a^{n-1})$. The density function of these men under class $n - 1$ is given by $\frac{f(x)}{F(a^{n-1})}$ for $x \leq a^{n-1}$. Substituting this into (6.1.1) yields:

$$r(y') = \frac{\beta}{1-\beta} \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^w} \int_{r(y')}^{a^{n-1}} (x - r(y'))f(x)dx \ .$$

Similarly, for men $x' + \epsilon = a^{n-1}$, $\Omega(x') = G(b^{n-1})$ and $\frac{g(y)}{G(b^{n-1})}$ for $y \leq b^{n-1}$. Thus,

$$\rho(x') = \frac{\beta}{1-\beta} \frac{\alpha M(\lambda^m, \lambda^w)}{\lambda^m} \int_{\rho(x')}^{b^{n-1}} (y - \rho(x'))g(y)dy \ .$$

Again, redefine $r(y') \equiv a^n$ ($\rho(x') \equiv b^n$), which denotes the lowest type man (woman) acceptable to the most desired women (man) not in class $n - 1$. Since $r(\cdot)$ ($\rho(\cdot)$) is nondecreasing, all women (men) not in class $n - 1$ will propose to a man (woman) with $x \geq a^n$ ($y \geq b^n$). Men satisfying $x \in [a^n, a^{n-1}]$ and women with $y \in [b^n, b^{n-1}]$ form marriage class n: they only accept each other, reject those of lower type, and are rejected by those in class $n-1$. ■

Proof of Proposition 2.

This proof follows Bloch and Ryder (2000). According to Proposition 1, class bounds are such that

$$a^n - \frac{\beta}{1-\beta}\frac{\alpha M(\lambda^m,\lambda^w)}{\lambda^w}\int_{a^n}^{a^{n-1}}(x-a^n)f(x)dx = 0 \ .$$

Using the implicit function theorem, the Leibniz integral rule, and some rearrangement, I find that

$$\frac{\partial a^n}{\partial \alpha} = \frac{\frac{\beta}{1-\beta}\frac{M(\lambda^m,\lambda^w)}{\lambda^w}\int_{a^n}^{a^{n-1}}(x-a^n)f(x)dx}{1+\frac{\beta}{1-\beta}\frac{\alpha M(\lambda^m,\lambda^w)}{\lambda^w}[F(a^{n-1})-F(a^n)]} \geq 0 \ .$$

Similarly, if the matching technology is subject to increasing returns to scale, i.e., $\frac{\partial M(\lambda^m,\lambda^w)/\lambda^w}{\partial \lambda^w} > 0$ then

$$\frac{\partial a^n}{\partial \lambda^w} = \frac{\frac{\beta}{1-\beta}\alpha\frac{\partial M(\lambda^m,\lambda^w)/\lambda^w}{\partial \lambda^w}\int_{a^n}^{a^{n-1}}(x-a^n)f(x)dx}{1+\frac{\beta}{1-\beta}\frac{\alpha M(\lambda^m,\lambda^w)}{\lambda^w}[F(a^{n-1})-F(a^n)]} \geq 0 \ .$$

The proof now goes by induction. For the basis step ($n=1$), note that $\frac{\partial a^1}{\partial \alpha} > 0$ and $\frac{\partial a^1}{\partial \lambda^w} > 0$. Assume that for $n-1$, $\frac{\partial a^{n-1}}{\partial \alpha} \geq 0$ and $\frac{\partial a^{n-1}}{\partial \lambda^w} \geq 0$. For the inductive step note that

$$\frac{da^n}{d\alpha} = \frac{\partial a^n}{\partial \alpha} + \frac{\partial a^n}{\partial a^{n-1}}\frac{\partial a^{n-1}}{\partial \alpha}$$

and

$$\frac{da^n}{d\lambda^w} = \frac{\partial a^n}{\partial \lambda^w} + \frac{\partial a^n}{\partial a^{n-1}}\frac{\partial a^{n-1}}{\partial \lambda^w} \ .$$

By the inductive hypothesis, $\frac{\partial a^{n-1}}{\partial \alpha} \geq 0$ and $\frac{\partial a^{n-1}}{\partial \lambda^w} \geq 0$. Also, using the implicit function theorem, Leibniz integral rule, and some rearrangement, it can be shown that

$$\frac{\partial a^n}{\partial a^{n-1}} = \frac{\frac{\beta}{1-\beta}\frac{\alpha M(\lambda^m,\lambda^w)}{\lambda^w}(a^{n-1}-a^n)f(a^{n-1})}{1+\frac{\beta}{1-\beta}\frac{\alpha M(\lambda^m,\lambda^w)}{\lambda^w}[F(a^{n-1})-F(a^n)]} \geq 0 \ .$$

Therefore, $\frac{da^n}{d\alpha} \geq 0$ and $\frac{da^n}{d\lambda^w} \geq 0$. A similar argument shows that $\frac{db^n}{d\alpha} \geq 0$ and $\frac{db^n}{d\lambda^m} \geq 0$ for all $n = 1, ..., N^m$. ■

Proof of Proposition 3.

This proof follows Bloch and Ryder (2000). For ease of exposition, assume men and women are symmetric, i.e., $\lambda \equiv \lambda^m = \lambda^w$, and $F(x) = G(y)\ \forall x = y \in [0,1]$. I start by defining the set of stable matches under the deferred acceptance algorithm (Gale and Shapley 1962).

Definition A1 *A matching is a one-to-one measure-preserving mapping from the set of men to the set of women. A matching is optimal if it maximizes total utility. A matching σ is unstable if there exists a blocking couple (x,y) in which both x and y are individually better off together than with the agent to which they are matched under σ, i.e., $y > \sigma(x)$ and $x > \sigma^{-1}(y)$. The Gale-Shapley deferred acceptance algorithm yields a stable and optimal matching ν.*

Lemma A1 *Under the assumption than men and women are symmetric, the Gale-Shapley deferred acceptance algorithm yields a unique stable and optimal matching ν such that $\nu(x) = x$.*

Proof. First, it follows that under symmetric populations and since one's type does not affects her payoff, any measure-preserving mapping is optimal. Formally, $\mathcal{U}_\nu = \int_0^1 xf(x)dx = \mathcal{U}_\sigma = \int_0^1 \sigma(x)f(x)dx$ for any measure-preserving matching σ, where $\mathcal{U}$ is the total utility.

Consider any measure-preserving matching $\sigma : [0,1] \to [0,1]$ such that $\sigma(x) \neq \nu(x)$. To show that such mapping σ is not stable, I partition the set of men into three disjoint sets: those who are better or under σ, those who are assigned to the same women under σ and ν, and those that prefer their ν assignment.

$$X = \{x \in [0,1] : \sigma(x) > \nu(x)\}$$

$$Y = \{x \in [0,1] : \sigma(x) = \nu(x)\}$$

$$Z = \{x \in [0,1] : \sigma(x) < \nu(x)\}$$

Since σ and ν are measure preserving and $\sigma(x) \neq \nu(x)$, X and Z have a positive measure. Now note that $\sigma^{-1}(x_0) = \sigma^{-1}(\nu(x_0)) = x_1$ can be interpreted as a mapping assigning to any man x_0 the man x_1 whom, under σ, is matched to x_0's partner under ν.

Clearly, $\sigma^{-1}(Y) = Y$, since these are the men whose assigned women do no change under σ and ν. Hence, $\sigma^{-1}(X \cup Z) = X \cup Z$. I now show that $\sigma^{-1}(X) \neq X$. Suppose $x_1 = \sigma^{-1}(x_0) \in X\ \forall x_0 \in X$. Then $\sigma(x_1) = \nu(x_0) > \nu(x_1)$. Since $\nu(x) = x\ \forall x$, $x_o > x_1$. Hence, σ^{-1} would map X into a proper subset of X. Therefore, for σ^{-1} to be measure preserving, there must be a full measure $x \in Z : \sigma^{-1}(x) \in X$. But if $\sigma^{-1}(x) \in X$, then $x > \sigma^{-1}(x)$ so that woman $\nu(x) = x$ prefers x to her match according to σ.

Further, since $x \in Z$, $\sigma(x) < \nu(x)$ so man x prefers woman $\nu(x) = x$ to his current match $\sigma(x)$. This couple (x, x) is indeed a blocking couple, implying that $\sigma \neq \nu$ is unstable.

Finally, to show that $\nu(x) = x$ is stable, consider any blocking couple $(x, y) : y \neq x$. If $y > x$, then the women prefers $\nu^{-1}(y) = y$ to x. If $y < x$, it is the man who prefers $\nu(x) = x$ to y. This implies that the set of blocking couples for $\nu(x) = x$ is empty. ■

Once equipped with Lemma 1, it is straightforward to show that as search frictions disappear, the marriage equilibrium converges to $\nu(x) = x$. According to Proposition 2, as α increases, marriage classes in equilibrium become smaller. Formally,

$$a^n = \frac{\beta}{1-\beta}\frac{\alpha M(\lambda)}{\lambda}\int_{a^n}^{a^{n-1}}(x - a^n)f(x)dx$$

is such that $\dfrac{\partial a^n}{\partial \alpha} \geq 0$. Similarly, using the implicit function theorem, the Leibniz integral rule, and some rearrangement,

$$\frac{\partial a^n}{\partial \beta} = \frac{\dfrac{\beta}{(1-\beta)^2}\dfrac{\alpha M(\lambda)}{\lambda}\int_{a^n}^{a^{n-1}}(x - a^n)f(x)dx}{1 + \dfrac{\beta}{1-\beta}\dfrac{\alpha M(\lambda)}{\lambda}[F(a^{n-1} - F(a^n)]} \geq 0 \ .$$

Now I show that $\dfrac{da^n}{d\beta} \geq 0$ by induction. Clearly, for a^1, $\dfrac{\partial a^1}{\partial \beta} > 0$. For any $n > 2$, $\dfrac{da^n}{d\beta} = \dfrac{\partial a^n}{\partial \beta} + \dfrac{\partial a^n}{\partial a^{n-1}}\dfrac{\partial a^{n-1}}{\partial \beta} \geq 0$ since $\dfrac{\partial a^n}{\partial \beta} \geq 0$, $\dfrac{\partial a^n}{\partial a^{n-1}} \geq 0$ as shown in the proof of Proposition 2, and $\dfrac{\partial a^{n-1}}{\partial \beta} \geq 0$ by the inductive hypothesis.

As search frictions disappear, that is, as the matching efficiency α and the discount factor β increase, the class bounds a^n collapse to two sequences $\{x\}_{x\in[0,1]}$. The highest type men and women $x = 1$ consequently adopt a threshold strategy such that they only match with agents of type $x = 1$. The highest ranked men and women not in class 1 again adopt a threshold strategy such that they only match with the highest ranked agents not in class 1. Iteration of this argument gives rise to $\nu(x) = x$, the unique stable and optimal matching derived by the Gale-Shapley deferred acceptance algorithm (Lemma A1). ■

Proof of Proposition 4.

From Proposition 1, it is clear that marriage classes in the exclusive market are defined such that:

$$\tilde{a}^n - \frac{\beta}{1-\beta}\alpha\frac{M(1-F(z))}{[1-F(z)]^2}\int_{\tilde{a}^n}^{\tilde{a}^{n-1}}(x - \tilde{a}^n)f(x)dx = 0 \ .$$

Using the implicit function theorem, Leibniz integral rule, and some rearrangement, I find that

$$\frac{\partial \tilde{a}^n}{\partial z} = \frac{f(z)\dfrac{\beta}{1-\beta}\dfrac{1}{[1-F(z)]^2}\left[\dfrac{2\alpha M(1-F(z))}{1-F(z)} - \alpha M_\lambda(1-F(z))\right]\int_{\tilde{a}^n}^{\tilde{a}^{n-1}}(x-\tilde{a}^n)f(x)dx}{1+\alpha\dfrac{\beta}{1-\beta}\dfrac{M(1-F(z))}{[1-F(z)]^2}\int_{\tilde{a}^n}^{\tilde{a}^{n-1}}(x-\tilde{a}^n)f(x)dx} .$$

Since, by assumption $\dfrac{2\alpha M(1-F(z))}{1-F(z)} \geq \alpha M_\lambda(1-F(z))$, it follows that $\dfrac{\partial \tilde{a}^n}{\partial z} \geq 0$. The proof now goes by induction. For the basis step ($n = 1$), note that $\dfrac{\partial \tilde{a}^1}{\partial z} \geq 0$. Assume that for $n-1$, $\dfrac{\partial \tilde{a}^{n-1}}{\partial z} \geq 0$. For the inductive step note that

$$\frac{d\tilde{a}^n}{dz} = \frac{\partial \tilde{a}^n}{\partial z} + \frac{\partial \tilde{a}^n}{\partial \tilde{a}^{n-1}}\frac{\partial \tilde{a}^{n-1}}{\partial z} .$$

By the inductive hypothesis, $\dfrac{\partial \tilde{a}^{n-1}}{\partial z}$. Also, as shown in the proof of Proposition 2,

$$\frac{\partial \tilde{a}^n}{\partial \tilde{a}^{n-1}} = \frac{\dfrac{\beta}{1-\beta}\dfrac{\alpha M(1-F(z))}{1-F(z)}(\tilde{a}^{n-1}-\tilde{a}^n)f(\tilde{a}^{n-1})}{1+\dfrac{\beta}{1-\beta}\dfrac{\alpha M(1-F(z))}{1-F(z)}[F(\tilde{a}^{n-1})-F(\tilde{a}^n)]} \geq 0 .$$

Therefore, $\dfrac{d\tilde{a}^n}{dz} \geq 0$. ■