# The London Season Marriage Mart: Matching technology and Sorting

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**Abstract**

The London Season, emerged in the 18th century and peaking in the 19th, was developed by the British upper society as a central clearing house for marriages. I use this marriage institution a natural experiment to isolate and examine the role of matching technology in determining sorting patterns. Evidence from the peerage records (Hollingsworth, 1964) suggest that the 19th century children of the British aristocracy followed marriage strategies on the basis of socioeconomic position, forming homogamic marriage classes. I identify the matching technology embedded in the Season as main determinant of these marriage patterns in two ways. First, I exploit exogenous variation in the number of people attending the most exclusive events of the Season: royal parties. To assess its causal effect on sorting patterns, I instrument party attendence with variations in the marriageable cohort size. Results suggest that when the Season was exogenously assembling large numbers of people, sorting in social position increased. Secondly, to identify the effects of the early Seasons for which party data is not available, I exploit wars involving Britain as exogenous disruptions, and find that social sorting was reversed coherently. Finally, computerizing new evidence on family seats from Burke's heraldic dictionary, I find that the pattern for geographic endogamy is also consistent with the existence of a centralized clearing house for marriages. *(JEL J12, N33)*

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*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

In 19th century Britain, between the sitting of the Parliament and the Glorious 12th of August, anyone who was to consider himself someone in the social *elite* was residing in London and attending social events such as debutante balls, royal parties, sports and equestrianism. This annual period, known as the London Season, soon emerged as the largest marriage market in the world. From presentations at court to royal parties, all social events taking place in the Season were meant "to aid the introduction and courtship of marriageable age children from the nobility and the gentry"[1]. This paper studies how this particular market enviroment shaped the marriage outcomes of the British nobility.

Sorting patterns are known to have important implications for many economic outcomes such as fertility (Hajnal, 1965) or inequality (Fernandez and Rogerson, 2001). Thus, it is important to know both who matches with whom and how are matches determined. The first question has been addressed thoroughly. A lot of empirical work has documented that marriages are not randomly set, but exhibit sorting patterns along many traits (Kalmijn, 1998). The answer to the what determines these sorting patterns, though, is not so clear and has been restricted to theoretical inference. Sorting can arise because of horizontal preferences: If everyone prefers those who look similar to them, positive sorting will arise naturally. Sorting can also arise even if preferences are vertical, because of competition. The ugliest man is willing to marry the most attractive girl, but he does not because he faces the competition of the most charming man. Independently of preferences, a market structure that increases the number of encounters between singles, in other words, that reduces the search friction[2], strengthens market competition and sorting. This would be the case, for example, of a matching technology embedding marriage brokers or a central clearing house for marriages (Bloch and Ryder 2000, Jacquet and Tan 2007). The gap in this literature is precisely to identify empirically the relative importance of each of these elements. Empiricists face the unsurmountable obstacle that marriage markets are implicit. We observe the outcomes of the marriage market, but we don't observe the market conditions under which these outcomes were cooked, making it very difficult to distinguish what fraction of the observed sorting comes from preferences and what fraction from the search friction and the market structure.

The London Season provides a unique environment to study both social sorting patterns in the British nobility, and its determinants. First, preferences over socioeconomic status were relatively stable over centuries (Hollingsworth, 1964; Thomas, 1971)[3], so any change in sorting patterns must be explained by the marriage market

[1] Extract from the London Season official webpage, www.londonseason.net

[2] For marriage search models see Smith (1993), Burdett and Coles (1997), Eeckout (1999), Shimer and Smith (2000), Atakan (2006).

[3] Hollingsworth finds that the children of the peerage had a strong and stable preference for class, only disrupted in 1721 and 1880, what he labels as "social revolutions" (pp.10). Thomas investigates the occupations of the commoners who mixed up with the peerage in these years, and finds that they held a very high socio economic status.

structure. Secondly, the matching technology embedded in the Season was very explicit. There were plenty of balls, parties, and concerts in which young ladies, after being publicly presented at court, could meet and court with eligible bachelors. Moreover, all these events were taking place in London. Thus, I will be able to measure accurately how exposed an individual was to the Season marriage mart. For example, those marrying in years in which the Queen sponsored numerous royal parties, the most exclusive events in the Season, were clearly more exposed to the Season matching technology than those marrying in years in which the central clearing house was disrupted by a war. In sum, the stability of preferences, together with the explicitness of the Season matching technology, will allow me to disentangle preferences from the search friction and the market structure as determinants of sorting.

To identify the effects of the London Season on marriage outcomes of the British *elite* I first characterize the marriage behaviour of the children of the peerage for the golden days of the Season between 1800 and 1875 (Pullar, 1978; Ellenberger, 1990). In line with previous work by Hollingsworth (1964), I find that marriage among the British nobility displayed large levels of social sorting. The children of the aristocracy followed marriage strategies on the basis of socioeconomic position, forming homogamic marriage classes. Segregation between commoners and peers, and within the peerage between dukes and barons, was well established. Roughly 30% of individuals related to the peerage (not necessarily heirs) married peer origin spouses. On the other hand, geographic endogamy (i.e, similarity in terms of geographical origin between matched spouses), was very low, consistently with a centralized marriage mart assembling singles from all over the country. Only one out of four peers married a peer spouse from her same or a bordering county. Further, the Season and the patterns for social and geographic sorting not only coincide in time, but there is a meaningful correlation between the number of people attending royal parties, the most exclusive events of the Season, and marriage outcomes. A more "intense" Season, with more people attending royal parties, is correlated with a smaller probability for a peer child to marry a commoner spouse, and with a larger distance between spouse's home country seats.

To assess causality, that is, to say that the Season actually brought its participants well positioned spouses from all over the country, I need some source of exogenous variation in participation rates to the Season. To this end, I exploit variation in the size of the girls marriageable cohort. Fertility decisions are taken long before children go to the marriage market, but clearly affect the number of singles participating in a centralized marriage mart, the number of programmed social events, and, in conclusion, how smoothly the Season matching technology works. Since cohort size affects marriage outcomes only through[4] participation rates to the Season, I use it as an instrument for my Queen party attendence explanatory variable. Results suggest that 100 more people attending the London Season (not necessarily young children of marriageable age) decrease the probability of marrying outside the peerage by 1%. On the other hand, more people attending the London Season also has effects on geographic endogamy. A hundred more people attending Queen sponsored events reduced the distance between spouses seats

[4]The exclusion restriction is confirmed by Botticini and Siow (2009), who conclude that decentralized local marriage markets do not display increasing returns to scale in their encounter functions.

by 3km.

Unfortunately, evidence for royal parties is not available except for the Victorian period. To identify the effects of early Seasons on marriage outcomes I will use wars involving Britain between 1700 and 1815, which disrupted the well functioning of the central clearing house for marriages. Since the exclusion restriction is not satisfied here (wars affect marriage outcomes directly, not only through distorting the London Season), I will exploit time variation by looking at pre Season outcomes. I find that, when the Season was not fully established, wars disrupt marriage outcomes in a "classic" manner: men manage to marry up (Abramitzky et al., 2011), and geographic endogamy goes down. On the other hand, wars at the beginning of the 19th century break the observed peer commoner segmentation and shift up endogamy, consistently with the disruption of a centralized segregative clearing house for marriages as the Season was.

This paper is not the first one to use an explicit marriage market to evaluate the determinants of sorting. Banerjee et al. use marital advertisements in Indian newspapers to check whether sorting in terms of caste comes from preferences. Hitsch et al., on the other hand, use data from a dating website site database to see whether sorting arises from preferences or from the reduced search friction implied by online dating technology. Among other empirical papers that are close in spirit to this one, see Abramitzky et al. (2011), Gautier et al. (2005), and Botticini and Siow (2009). The former uses the First World War as a natural experiment to study the role of sex ratios as a determinant of marriage outcomes. They find that marriage outcomes of men improved more in regions which were more affected by the war, that is in regions with largely distorted sex ratios, supporting the predictions of standard theoretical marriage models. Gautier et al. (2005) analyze the city as a marriage market. Looking at migration flows in and out the city, they find that it is a more attractive place to live for singles than for married couples because it offers more possibilities to find a partner (i.e, a better matching technology). Finally, Botticini and Siow (2009) analyze the city and countryside descentralized marriage markets for the US, early renaissance Tuscany, and pre reform China, finding no evidence of increasing returns to scale in the encounter function in any of these societies. My paper poses a great advantage over these: I can look at the effects of matching technology in perspective. In other words, I can infer to what extent these improvements in the matching technology affected broader economic outcomes for an important and trackable population, the British nobility.

The study of the London Season marriage mart is also motivated by a vast literature studying the British nobility itself. Few studies, however, have exclusively focused on the Season. Sproule (1978) and Pullar (1978) are notorious exceptions, but their use of descriptive and anecdotal evidence is completely orthogonal to the methodology presented here. On the contrary, the demography of the British peerage has been exhaustively studied by Hollingsworth (1957), (1964). Hollingsworth computerizes evidence from the peerage records and presents a detailed summary of aggregate statistics of the nobility vital events: age at marriage, life expectancy, infant mortality, among many more. Thomas (1972) extends his analysis to social mobility, and finds that the only open door to enter the nobility

was for highly endowed commoners. Cannadine (1990), Allen (2009), and Ellenberger (1990), on the other hand, analyze the rise and fall of this *elite*, which after ruling the country for a much longer period than their continental "peers", accumulating most of the British cultivable land in few of their hands, unexpectedly lost most of their influence. Finally, the Stones (Stone and Stone 1984) and the Springs (Spring and Spring 1985) have debated over the degree of openness of this class to newcomers, that is, to people who gained their wealth in the manufacturing industries. The study of the London Season and its social sorting implications contributes to this debate. If such a segregative clearing house for marriages is proved to be an important feature of the British aristocracy, the opened elite hypothesis should be reconsidered.

The data for this project is gathered from various sources. To describe the marriage behaviour of the British *elite*, I use evidence from the peerage records computerized by Hollingsworth (1964). This dataset contains entries resuming the lives of 26,000 members of the British peerage, their sons, and their spouses[5]. It is a very valuable source of information to derive the social position of spouses, their age at marriage or whether their title was a peerage of England and Wales, Scotland, or Ireland. Unfortunately, no information regarding their birthplace or their residence is available. In order to introduce the geographic dimension into the analysis, I complement the Hollingsworth dataset with information of 628 family seats from Burke's heraldic dictionary (1826), which I manually geocode. Finally, evidence on invitations to Her Majesty balls, concerts, and all sort of royal parties can be found in The Lord Chamberlain's Department at the National Archives in Kew. To construct the series used in this paper, I went through each and every single invitation list between 1851 and 1875, computerizing the numbers invited, excused and attended to each party.

The rest of the paper is organized as follows. Section 2 reviews the historical background of the London Season. Section 3 presents a simple two sided search model that captures the main insights of the partner selection problem, and Section 4 characterizes theoretically the London Season as a marriage market using this framework. The empirical analysis is explained in Sections 5 and 6. The former presents the data used in this paper, and the later develops the identification strategy and the results. Finally, Section 7 concludes and discusses several lines for future research.

## 2 The London Social Season

The British *Society* was composed by the Royals, the peers (dukes, earls, marquesses, viscounts, and barons), old landed gentry (baronets and knights, whom helded a title but were not represented at the House of the Lords), politicians and some successful doctors and artists. This *elite* usually resided in manors on large estates in the country. However, coinciding with the sitting of the Parliament in Easter, they moved up to London to engage in running the country. In the Glorious 12th of August, when the shooting season started, these families returned to

[5]This information, originally in the form of 37,000 punched cards, has been computerized by The Cambridge Group for the History of Population and Social Structure, who kindly allowed me to use their dataset.

their permanent residences in the countryside. This period in which the British aristocracy resided in the capital is known as the London Season.

Although it is obvious that the London Season was a mean for the social *elite* to execute its political influence and to engage in important businesses, when one thinks on the Season a different image comes to mind: Court presentations, *debutante* balls, dinner parties, Royal Ascot, Derby ... F.H.W Sheppard (1977) provides some evidence in support of this claim.

[FIGURE 1 HERE]

Figure 1 plots inflows and outflows from Grosvenor estate, one of the most exclusive neighborhoods in London in which the British elite used to reside during the Season. Although seasonal migrations coincide with the Parliamentary calendar, two factors support the claim that the Season was not just a political story. First, cumulative inflows peak from Easter Sunday to the Glorious 12th of August, the period in which, according to the traditional calendar, most of the social events embbeded in the Season were taking place. On the other hand, looking at individual evidence, it can be seen that families which were not prominent in politics, such as the Earls of Verulam and Wilton, also shown the same migration pattern. Therefore, it seems that the London Season must have provided opportunities other than political lobbying. More than that, one can presume that the Parliamentary motive actually played a secondary role. Parliament sessions were even adjourned when the Derby took place. As the Harper magazine stated in 1886, "The Season depends on Parliament, and Parliament depends on sport".

In particular, as it can be inferred from reading Jane Austen, the unspoken purpose for these festivities in which the whole British aristocracy was involved was to bring together the right sort of people, thus providing the setting for the largest marriage market in the world. It was the perfect opportunity for young girls to be presented to suitable young men and their families in the hope of finding them the appropriate husband. The race for finding a proper husband started with the presentation at Court. Young girls, usually aged 18, were presented to the Queen at St. James's Palace This event, considered the most important day in a woman's life, symbolized the change in status from childhood to adult life. Ashford and Debrett texts describe accurately the strictness of the presentation:

> *"They were required to wear a white dress with a train three yards long and feathers in their hair which could be seen by the Queen from the other end of the room. The neck and arms of the dress were bare in Victorian and Edwardian times. They had to walk down the length of the long room and curtsy before the Queen; their train was held by an attendant". Ashford.*
>
> *"On presentation, the debutante and her mother were ushered into the Royal presence, and announced. The debutante stepped forward and made a low curtsy to both the King and Queen, who each bowed in acknowledgment. She was then expected to exit, walking backwards, from the Royal Presence". Debrett.*

Informally, the presentation at Court was known as *coming out*, that is, to be launched into society. After entering society the young aristocrat days during the London Season were extremely busy. Breakfast with guests,

cricket matches, promenades, afternoon tea, evening meal, opera, theater and, evening balls at Court ... It was usual for a young lady to start the day with a ride over Hyde park at 10 am and end up at 3 am the following morning at a ball (Malheiro, 1999). Lady Dorothy Neville remembered than in her first Season she attended to "50 balls, 60 parties, 30 dinners and 25 breakfasts" (Aiello, 2007). Almack's were the most popular events for husband hunters. Royal parties, on the other hand, where the most exclusive. The Royal Academy Summer exhibition was considered the first round for *debutantes*, while "Ascot races were always the high point of the Season. They were described as the Eden of debutantes and the milliners' harvest" (Harper's Magazine, 1886). Many young ladies met their future husbands at these events.

However, even though this routine was stressful, future couples did not have much time to get to know each other privately because of decorum rules. Therefore, marriages were often not love matches but based on money or eligibility. This was the case of Fanny Price, in Jane Austen's Mansfield Park. She was chided by her uncle Thomas Bertram for refusing rake Henry since he believed that she was very lucky to receive this proposition from such an eligible man (Ashford, 2004). Adultery was also a common signal that marriages were arranged for reasons other than love. Alva Vanderbilt arranged a marriage between her daughter Consuelo and the Duke of Marlborough. At the time of marriage, however, both were in love with someone else. Jennie Jerome's sister, Leonie, entered into an arranged marriage that provided nothing but disappointment. To mitigate her marriage deception, she held a romance with Queen Victoria's youngest son for all of her life (Aiello, 2007).

The Season in its traditional form arose somewhere in the 17th century and evolved until it reached its peak around the 19th century. After the 1870s the Victorian society started its decline, and it was well reflected in the London Season. Many events became public and young ladies from commoner or colonial origin started to be presented at Court (Ellenberger 1990). Nowadays, the Season remains as a tradition, but many of their distinctive traits such as Court presentations or private parties have disappeared[6].[7]

This anecdotal evidence on the London Season can be used to infer many of the social and behavioural changes that the marriage institution suffered in Britain from the 17th to the 20th century. Marriage was no longer a matter of biological fertility nor procreation, but an economic decision. Wealth and social position were the key components of a single's charm, which remained stable over centuries (Hollingsworth, 1964). Moreover, the London Season served "to aid the courtship of marriageable age children from the nobility and the gentry" (londonseason.net). Court presentations publically announced who was on the market, while a stressful routine of balls, dinners, and garden parties offered young aristocrats from all over the country illimited opportunities to meet and court.

[6]Presentations at Court were only abolished by Queen Elisabeth in 1958.

[7]For detailed essays on the London Season, see Debrett's Traditional Season; Ashford (2004); Aiello (2007); and wikipedia.org

# 3 The Basic Model

As much of the search and matching literature (Diamond 1981, Mortensen 1982 and Pissarides 1984), this model assumes bilateral random meetings over discrete time periods. The rate at which contacts are made is determined by an encounter function. Given the number of participants in the market, this function gives the number of random meetings per period. In this marriage setting, $E(M, W, A)$, determines the number of encounters as a function of the number of bachelors ($M$) and single women ($W$), as well as the efficiency of the marriage market ($A$). Define $\alpha_m(M, W, A) = \frac{E(M,W,A)}{M}$ as the single male encounter rate (analogous for single women). Note that yet I don't assume any functional form for $E$. If the courtship technology is highly efficient, there might be increasing returns to scale, that is, that concentrating more people in the marriage market increases the number of encounters, but I leave open this question for the next section. Finally, I also assume that participants in the market seek to form long term partnerships, that is, to form life lasting marriages.

Since the search and matching literature is mainly focused on employment, I need to do several assumptions that depart from the standard literature in order to adapt the model to marriage decisions. First, I assume that agents are ex-ante heterogeneous. The market is populated with a continuum of bachelorettes (bachelors) characterized by their socioeconomic attractiveness, $x_w$ for females and $x_m$ for males[8]. Let $x_i$ be distributed according to $G_i$ over finite support $[\underline{x}, \overline{x}]$ for $i = m, w$. The second non-standard assumption here is the specification of non-transferable utility[9]. In order to maintain the population in steady state I assume clone replacement, that is, that when two agents are matched and leave the pool of singles they are automatically replaced by two clones.

## 3.1 Preferences

Agents flow utility function depends on the state in which they are. To simplify notation, assume single agents receive a flow utility payoff of 0. When they are married, on the other hand, they receive flow utility equal to the socio economic position of his/her partner. So, as it was announced before, I restrict utility to be non transferable. Formally, $u_m(x_w) = x_w$ is the flow utility of a single male married with a female of attractiveness $x_w$. This preference specification guarantees positive assortative matching, that is, that attractive agents are willing to find attractive partners[10].

[8]The term economic attractiveness will be more specifically defined in the empirical section. We will use the highest rank a men was heir to at age 15, and the parental title for females. Although, obviously, this measure is not continuous, the model will be populated with a continuum of types for ease of exposition.

[9]Collin and McNamara (1990), Smith (1993), Bloch and Ryder (2000), Burdett and Coles (1997) and Eeckout (1999) use similar assumptions in their marriage models.

[10]The fact that I ruled out narcissism, that is, that agents enjoy their own economic attractiveness, is not necessary for the results. A utility specification in which single agents enjoy their attractiveness level $x_w$ and married agents enjoy the sum of the couple's members attractiveness $u_w(x_m, x_w) = x_m + x_w$ would yield the same results (Burdett and Coles (1999)). Other utility specifications in which agent's attractiveness interact $u_w(x_m, x_w) = f_1(x_m) \cdot f_2(x_w)$ guarantee positive assortative matching as long as they are log supermodular (Shimer and Smith (2000)). However, they do not display the partition solution (see Burdett and Coles 1997) that will be developed here unless preferences are multiplicatively separable (Eeckhout 1999).

Let a woman's discounted (at rate $\beta$) lifetime utility be:

$$V(x_w) = \beta \left[ \alpha_w(\cdot)\mu(x_w) \int_{\underline{x}}^{\overline{x}} max \left\langle W(z, x_w), V(x_w) \right\rangle dF(z|x_w) + \alpha_w(\cdot)(1 - \mu(x_w))V(x_w) + (1 - \alpha_w(\cdot))V(x_w) \right] \quad (1)$$

where $\mu$ stands for the proportion of males who propose to her and $F(z|x_w)$ the distribution of attractiveness among them.

The corresponding value function for a female $x_w$ married with a male $x_m$ is:

$$W(x_m, x_w) = x_m + \beta W(x_m, x_w) \quad (2)$$

### 3.2 Marriage Decision

Once in the market, singles follow utility maximizing strategies over which offers to accept given the behaviour of others. In particular, this takes the form of a list of people to whom each single is willing to marry. That is, the optimal strategy for a woman of attractiveness $x_w$ is to set a reservation match threshold $R(x_w)$ such that all proposers yielding a utility above it are accepted. She sets $R(x_w)$ such that marrying this reservation candidate yields her the same utility as remaining single: $W(R(x_w), x_w) = V(x_w)$. Of course, this reservation strategy depends on the behavior of the other singles. In this subsection I am going to characterize these market equilibrium strategies.

Consider the problem faced by the most attractive woman in socio economic terms ($x_w = \overline{x}_w$). Note that all men will propose to her, so $\mu(\overline{x}) = 1$ and $F(z|\overline{x}_w) = G(z)\ \forall z$. Hence, I can rewrite (1) for the wealthiest woman as

$$(1 - \beta)V(\overline{x}_w) = \beta \left[ \alpha_w(\cdot) \int_{\underline{x}}^{\overline{x}} max \left\langle W(z, \overline{x}_w) - V(\overline{x}_w), 0 \right\rangle dG(z) \right]$$

Using the reservation match equation, some rearrangement and integration by parts I find that the optimal reservation match for the most attractive woman $R(\overline{x}_w)$ is:

$$R(\overline{x}_w) = \frac{\beta}{1 - \beta)} \alpha_w(\cdot) \int_{R(\overline{x}_w)}^{\overline{x}} (1 - G(z))dz \quad (3)$$

The reservation strategy for the most attractive man, $R(\overline{x}_m)$, is completely symmetric. Note that as the worthiest man is willing to propose to all woman with atractiveness $x_w \geq R(\overline{x}_m)$, all this women will be desired by all men as if they were the most charming one. Therefore, they will be equally selective and, thus, use the reservation strategy of the worthiest woman. Similarly, all men such that $x_m \geq R(\overline{x}_w)$ will use the same strategy as the worthiest man. So, $[R(\overline{x}_w), \overline{x}] \times [R(\overline{x}_m), \overline{x}]$ constitutes the first marriage class which behaves in an endogamic way (i.e, agents in this class only marry members of this same class). Rewrite $R_{1,w} = R(\overline{x}_w)$ as the reservation strategies of class 1 women ($R_{1,w} = R(\overline{x}_w)$ for class 1 men).

Consider now the worthiest woman not belonging to class 1. The problem faced by her has the same structure as before, with all men not in class 1 willing to marry her. Thus, I can derive the reservation match strategies for

the worthiest singles not in class 1 in an analogous way:

$$R_{2,i} = \frac{\beta}{1-\beta}\alpha_i(\cdot)\int_{R_{2,i}}^{R_{1,i}}[G(R_{1,i}) - G(z)]dz \qquad for\ i = m, w$$

Similarly a second class $[R_{2,w}, R_{1,w}) \times [R_{2,m}, R_{1,m})$ will be formed. We could extend this argument and find a PRE 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 PRE Marriage Equilibrium consists in a sequence of reservation strategies* $\{R_{n,i}\}_{n=0}^{N}$ *for* $i = m, w$ *such that:*

- $R_{0,i} = \overline{x}$
- $R_{n,i} = \frac{\beta}{1-\beta}\alpha_i(\cdot)\int_{R_{n,i}}^{R_{n-1,i}}[G(R_{n-1,i}) - G(z)]dz$
- *Male singles in class n* $x_m \in [R_{n,w}, R_{n-1,w}]$ *only marry women in class n* $x_w \in [R_{n,m}, R_{n-1,m}]$

See Burdett and Coles (1997) for the formal proof, which follows the intuition described above.

# 4 Theoretical analysis of the London Season

Let there be $L$ local marriage markets indexed $1, ..., L-1$, and the London Season $L$. Each of these marriage markets can be characterized by the quadruple $\left\{\alpha(A_\ell, M_\ell, W_\ell); \frac{M_\ell}{W_\ell}; G_\ell; \Gamma_\ell\right\}_{\ell=1}^{L}$. The first element is the encounter efficiency of the market, that is, how often it allows young singles to court; $\frac{M_\ell}{W_\ell}$ is the ratio of men to women in this market; $G_\ell$ the distribution of charm; and $\Gamma_\ell$ represents the distribution of geographic origin among participants to marriage mart $\ell = 1, ...L$. Note that geographic origin does not enter the utility function.

In opposition to local marriage markets, the London Season offered its participants unlimited number of opportunities to meet and court in all sort of social events such as balls, dinners, royal parties, ... This highly efficient clearing house for marriage can be characterized in this contest as a large encounter efficiency $A$, and a functional form including increasing returns to scale. The more noble children participating in the Season, the more smoothly its matching technology would work. Moreover, participating in the Season was highly restricted to the upper rungs of the society: only the Royals, peers, landed gentry and some highly endowed commoners attended. This high peer-commoner segregation can be modeled by a less dense lower tail in the attractiveness distribution $G_l$ for the Season marriage mart. Finally, the Season pooled singles from all over the country. In other words, the Season displayed larger heterogeneity in terms of geographical origin than local marriage markets, which can be formalized with a $\Gamma$ distribution displaying larger variance.

The comparative statics in this section try to answer two questions. First, how would the development of the London Season, with its particular matching technology, have affected marriage behaviour? That is, how do marriage outcomes would look like in the Season golden days, with a market environment with large encounter rates, high segregation, and singles coming from distinct places? Second, how would marriage outcomes change when this centralized marriage mart was distorted? In particular, in order to derive testable predictions for the empirical exercise, I am interested in two types of disruptions to the central clearing house for marriages: those affecting participation rates (and, by the assumption of increasing returns, the encounter rate), and those also affecting its sex ratio (as it will be the case, for example, of wars).

## 4.1 Segmentation

An increase in the encounter rate and a less dense lower tail of the attractiveness distribution intuitively makes more likely for everyone to eventually encounter a top potential partner. Therefore, the main trade off that agents face between marrying sooner to enjoy marriage flow utility and waiting to get a good type may be affected. Singles may show more prone to wait the larger is this encounter rate parameter, and the less dense is the lower tail of the attractiveness distribution. As a result of this, agents end up rejecting more offers, the class bounds increase and thus a larger number of smaller classes results. Formally,

**Definition 2** *(Segmentation) A marriage equilibrium* $\{R_{n,i}\}_{n=0}^{N}$ *is more segmented than an equilibrium* $\left\{R'_{n,i}\right\}_{n=0}^{N'}$ *if* $R_{n,i} \geq R'_{n,i} \quad \forall n = 1, ..., N$ *and for* $i = m, w$*, holding with inequality for some* $n$ *and* $N \geq N'$*.*

**Proposition 3** *(Segmentation) An increase in the rate at which agents meet* $\alpha_i(\cdot)$*, and a reduction of the lower tail of the attractiveness distribution* $g(\underline{x})$*, shift the marriage equilibrium towards segmentation.*

See Appendix A for a formal proof.
Since marriage classes are formed on the basis of socio economic attractiveness, an increase in the number of classes will generally increase the socio economic similarity between partners. If the increase in the encounter rate is large enough, there might even be perfect positive assortative matching in equilibrium.

**Proposition 4** *(Adachi, 2003) As search costs become negligible,* $\beta \to 1$*,* $\alpha \to 1$*), the set of equilibria converges to the set of stable matchings derived under the deterred acceptance algorithm (Gale and Shapley, 1962), with perfect assortative matching.*

See Adachi for a formal proof.

In conclusion, two testable predictions follow from this result: First, I can check whether in the 19th century, the golden days of the Season, there is any evidence of clearly defined marriage classes on the basis of socio economic

position. Secondly, for individuals less exposed to the Season, this result should be reversed. In particular, in years in which participation rates to the Season were exogenously disrupted, or many of its social events were canceled, I can test if I observe less segmentation in marriage outcomes.

### 4.2 Sex ratios

Since I want to use 18C wars as a source of disruption to the Season it would be interesting to look at how the marriage equilibrium would look like when one side of the market is shorter. Consider Figure 2 for seek of illustration. Since there are fewer men in the market, all women, threatened by the possibility of remaining single for their whole life, will become less picky and accept least acceptable types whenever they meet them. Men, on the other hand, will look more desirable *ceteris paribus*, so they will rise their reservation strategies. Formally, $\alpha$ will be higher for men than for women. So, in equilibrium, classes will take the asymmetric form in Figure 2, where men manage to get better spouses.

[FIGURE 2 HERE]

For our comparative statics purposes, unbalanced sex ratios are expected to allow men to marrying up. However, note that in case of wars there might be other effects on marriage outcomes. In the case of a marriage mart with increasing returns, as the London Season was, the fact that during wars participation rates and the number of "celebrations" are lowered, will additionally decrease marriage segmentation. In other words, we will expect wars to distort sex ratios always (men marrying up), and in periods in which the Season was peaking, we will also expect them to reverse the segmentation and sorting patterns as it is stated in Proposition 3.

### 4.3 Location

I have characterized the Season as a centralized marriage market where the nobility from all over Great Britain came to London in order to participate. On the other hand, the country estate marriage market has been described as a rural market, where young bachelors mainly met local candidates, and only occasionally had the opportunity to know young singles coming from far away. A logic conclusion from this argument is that marriages in the London Season should display a larger degree of heterogeneity in terms of geographical origin of the couple. Therefore, in the Season golden days, as well as in years in which it works smoothly, I should expect low levels of geographic endogamy.

**Observation 5** *(Geographic endogamy) A marriage market with participants coming from more heterogeneous origins, that is, with a $\Gamma_\ell$ geographic distribution displaying larger variance, ends up matching spouses from more distant places. Formally, a marriage market $\ell$ with $(var(\gamma_\ell) > var(\gamma_{\ell'}))$ is such that*

$$\int_{\underline{g}}^{\overline{g}} \gamma_\ell(z) \int_{\underline{g}}^{\overline{g}} \gamma_\ell(x) dist(z,x) dx dz > \int_{\underline{g}}^{\overline{g}} \gamma_{\ell'}(z) \int_{\underline{g}}^{\overline{g}} \gamma_{\ell'}(x) dist(z,x) dx dz$$

*where $d : [\underline{g}, \overline{g}]^2 \to \Re$ is a distance function.*

The proof follows from geographic origin not entering the utility function of spouses.

# 5 The Data

The data for this project is gathered from various sources. To describe the marriage behaviour of the British *elite*, I use evidence from the peerage records computerized by Hollingsworth (1964). To introduce the geographic dimension into the analysis, I complement the Hollingsworth dataset with family seats from Burke's heraldic dictionary (1826). Finally, the strength of the Season can be assessed with evidence on invitations to Her Majesty balls, concerts, and all sort of royal parties, which can be found in The Lord Chamberlain's Department at the National Archives in Kew.

## 5.1 Peerage records

The British society is divided into classes according to their political influence. The head of the society is the Sovereign, who is considered the nation's "fount of honour". The second strand is the peerage. It is formed by the nobility with the hereditary titles of Duke (highest rank), Marquess, Earl, Viscount and Baron. Belonging to this class ensured representation in the House of the Lords. A key difference between peers and European high nobility was that the social condition was only inherited by the heir, not by the entire family, which greatly reduced the size of the nobility. The rest of individuals who were neither peers nor Royals were considered commoners. Again, the term differs from its meaning in Europe since lower rungs of the nobility belonged to this class. In particular, noble commoners are usually referred as landed gentry, that is, those who owned extensive estates in the countryside and were not required to work, except on the management of their own lands. In particular, they held the hereditary title of Baronet or the non-hereditary title of Knight. The rest of the common people included merchants, peasants, industrials, ...

The people participating in the Season, that is, *the fashionable world*, was composed by the Royals, peers, old landed gentry, politicians and some successful doctors and artists. This well defined group soon awoke the curiosity of the whole British society, which derived in the publication of their family histories. Peerage records had a tremendous impact in the British society. Many noblemen read them as one of their preferred hobbies, and certainly those books were best sellers. In 1676 Sir William Dugdale wrote his Baronage, and in 1710 Arthur Collins published his peerage. Since then, many genealogic studies have updated and completed these records[11]. Among all these publications, 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 to developed a similar record for those smaller landowners who generally had no titles apart from Knighthoods and Baronetcies. John Burke's *Landed Gentry*, first published in 1826, was later on exhaustively amplified by its son Bernard Burke. This last historical record tends to be quite mythological, result of centuries by word of mouth. Oscar Wilde once said, "It is the best thing the English have done in fiction" (Burke's family et al., 2005).

[11]The major change that we observe is the incorporation of the Scottish and Irish high nobility to the peerage as the four home nations became integrated, first in Great Britain and finally in the UK. The establishment of the Irish Free State in 1922 did not affect the rights of the hereditary peers of Ireland

These original family records stand as "a historical account of the lives and most memorable actions of 'our' British nobility" (Dugdale's Baronage, 1676). For seek of illustration, we extract Arthur Hill's life record from Cokayne's *Complete Peerage* (see Figure 3). From this brief life record we can learn a lot about him along various dimensions. According to this entry, Arthur Hill lived for 48 years (Feb 1753- Sept 1801). He got married at age 33, and his marriage lasted for 15 years until his death. Arthur Hill held a high social position, being entitled Marquess, Earl and Viscount. Moreover, he took his seat in the House of the Lords. His economic position can also be traced out, but unfortunately without the same accuracy. He must have been a very wealthy person, considering his studies in Oxford, his brief military career and his positions of M.P, Governor and Grand Master of Freemasons. Its Irish possessions would also have reported him large incomes. They were said to be valued £50,000.

Importantly, we can also do a similar analysis for his wife, Mary Sands. She lived for 72 years (1764-1836). She got married at age 22. Socially she also held a very high position: She was Viscountees of Down, and later on she was honoured Baroness. She must also had been very wealthy since, at the time of her marriage, the Duke of Rutland congratulated Arthur Hill for obtaining "a great accession of fortune" and "a considerable estate in this kingdom".

[FIGURE 3]

All this genealogical material was collected by T. H. Hollingsworth, for his study of the British peerage. In its original form, the database consists of 37,000 punched cards containing data on the life of about 26,000 individuals together with their spouses[12]. These consist on peers who died between 1603 and 1938 (primary universe) and their children (secondary universe). Note that many agents under study may belong to both the primary and the secondary universe. In particular, cards contain information on:

1. Vital Events. Date of birth, marriage and death. When those are unknown, they are approximated with baptisms or marriage licenses. There is also information on number of sons.

2. Socio Economic Status. Status of each person as a peer (subdivided into Royal, Duke or Marquess, Earl, and Viscount or Baron) or not, (subdivided into Baronet, Knight, Commoners and Foreign). Moreover, it is stated whether an individual was a peer by inheritance or by creation. Finally there is also information on whether he was already appointed heir by age 15. All this information is also presented for the parents.

3. Peerage of origin. The cards state whether an individual's title belonged to the English and Welsh, Scottish, or Irish peerage. For commoners, one can distiguish whether they were European, Canadian or from the United States.

[12]The original collection can be found at The Milton S. Eisenhower Library (Special Collections), Johns Hopkins University, with unrestricted access (http://ead.library.jhu.edu/ms359.xml). The Cambridge Group for the History of Population and Social Structure was very kind to provide us with a computerized version of the database.

The primary universe was defined from *The Complete Peerage (1910-59)*, Cokayne. The universe of children was found from a variety of sources: *Peerage of England* by Collins, *Peerage of Ireland* by Lodge, *Scots Peerage* by Douglas, Burke's *Extinct Peerage* and modern Peerage editions as Burke or Debrett. The remaining gaps were filled from a large list of sources, among which Burke's *Landed Gentry* stands out.

## 5.2 Family Seats

The Hollingsworth dataset is a very valuable source of information on social position of spouses, their age at marriage or whether their title was a peerage of England and Wales, Scotland, or Ireland. Unfortunately, no information regarding birthplaces or residences is available. To solve for this I will take advantage of the fact that aristocracy was strongly tied to land. Each and every entitled family was required to build a country seat in its estate, and to live there for most of the year, generation over generation[13]. Thus, the location of the family seat reflects where a young aristocrat was living for most of the year, and more precisely where she could meet potential partners other than the ones from the London Season. Therefore, the distance between spouses' family seats gives some information on whether a couple was matched in the Season or in local marriage markets. If the spouses family seats were close to each other, it is likely that their marriage was arranged in the local marriage market; while if their seats are distant, they probably courted in the Season[14].

Family seats can be found in some heraldic dictionaries of the peerage of the United Kingdom. These dictionaries are somehow a summarized version of the peerage records previously described, but contain additional information at a family level, such as religious affiliation, motto, or family seat. The most suitable heraldic dictionary for the purpose of studying the London Season is Burke's publication from 1826. Most of the young aristocrats who married in the 19C were recorded as presumptive heirs in this source. Therefore, the family seats in Burke's heraldic dictionary correspond mainly to the seats in which the participants of the golden day's Season grew up. Moreover, since country seats were so expensive to build up, and so representative of long lasting lineages, they usually remained in the hands of the same family generation through generation. This allows us to attach these 1826 family seats to its ancestors and offspring without much concern.

After manually recording each and every single entry in Burke's heraldic dictionary, I have information on 628 country seats for 458 families linked to the peerage. In particular, I know the name of the seat, the entitled family to which it belonged, the nearest town, and the historical county in which it was located. To have a more precise notion on where seats were located, I attached its World Geodesic Coordenates (WGS84). For many seats, currently

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

[14]Of course, not all marriages with spouses grown up in distant places were arranged in the Season; and some of the geographically endogamic marriages were accorded there. The argument I will develop is that the existence of a centralized marriage market in London eased marriages between spouses from all over the country, that otherwise would involve large mobility and transport costs. Therefore, the Season might bring as an outcome larger exogamy than decentralized marriage markets.

considered valuable architectonic heritage or converted into luxurious hotels and golf clubs, this information was available in wikipedia.org. For the remaining seats, I attached the WGS coordinates of the closest village I could find.

The majority of families only owned one seat (339), while seven families owned up to 4 seats[15]. On the other hand, the bulk of the families recorded held a title from the English peerage (53.49%), followed by those being peers of Ireland (32.31%), and Scotland (14.19%). To illustrate the geographic distribution of the recorded seats, see Figure 4. The range of family seat per county is divided into certain intervals and shown through respective colors. At first sight one can see that country seats are dispersed all over the British Isles. Almost all counties have at least one recorded seat. Moreover, as it was pointed before, they are quite isolated from each other. Many counties only have one seat, and the average number of seats per county roughly reaches six. The majority of the recorded seats are located in English counties, especially in the South East region. The seat density falls as we go west, becoming very low (less than 3 seats per county) in Wales. Scotland is also narrowly populated by seats, although as we approach the English frontier the density rises. Finally, in Ireland, most of the seats are concentrated in the central and southern counties.

[FIGURE 4 HERE]

After attaching to each individual in the Hollingsworth dataset its corresponding family seat(s), I have geographic references for 10,046 peer children and for 3,014 spouses[16]. In sum, I have 1,960 couples where both spouses' seats are recorded, and therefore for whom I can define geographic endogamy variables[17]. In particular, I derive distances between spouses seats using Vincenty's algorithm (1975), and three dummies, each indicating whether husband and wife's seats were located (1) in the same county (county endogamy); (2) in the same county or counties sharing a border (county border endogamy); and (3) in the same geographic division[18] (division endogamy).

[15]These seven families were the Cavendish, dukes of Devonshire; the Grenvilles, dukes and marquesses of Buckingham and Chandos; the Hills, marquesses of Downshire; the Howard's, dukes of Norfolk; the Kennedys, earls of Cassilis; the Scotts, dukes of Bucckeuch and Queensbury; and the Shirley's, earls of Ferrers.

[16]In detail, I match the titles recorded in *family seats* with the individuals in Hollingsworth (1964) labeled with the same title for males, and with the same parental title for women. When male's own title is not available in Hollingsworth, I try to match it with his parental title. When female's parental title is not reported, I try to match it with her own title. With this methodology, all but 4 titles from Burke's heraldic dictionary where matched with individuals in the Hollingsworth compilation of peers. Moreover, some entries in Hollingsworth (1964) are labeled with two titles, such as James Richard Stanhope (1880-1967), 7th earl of Stanhope and 13th earl of Chesterfield. I merge these individuals with all the information for both titles as compiled in Burke's heraldic dictionary. That is, Stanhope will be recorded as having grown up in both the Chesterfield and the Stanhope country seats.

[17]Note that these 1,960 couples are, by construction, a group with particular characteristics. More precisely, both spouses share peer social origin (otherwise I could not have labeled them with a country seat). Therefore, from now on, when geographic endogamy is evaluated, I will restrict our conclusions to individuals linked to the peerage that married in the peerage. That is, I won't say anything about the geographic endogamy pattern of peers marrying outside the peerage, for example.

[18]Divisions are defined in the following manner: I chose (NUTS 1) regions for England, Scottish Parliament electoral regions for Scotland, the four provinces for Ireland, and I counted Wales as a single geographic division.

### 5.3 Royal parties from Lord Chamberlain records

The Lord Chamberlain's Department at the National Archives in Kew, London, provides abundant evidence on invitations to Her Majesty balls, concerts, and all sort of parties held at Buckingham or St. James's Palace. In particular, those individuals invited to this exclusive events are listed in hierarchical order, commencing with the British royalty, ministers, ambassadors, and, finally, the *fashionable world*. Absentees are also listed or appear with their names crossed off. Finally, a note is sometimes included summarizing the total numbers invited to the event, the numbers attending and absent. The period covered goes from 1839-1902[19].

I computerized the number of invitations issued, the numbers attending and excused, the type of party (ball, concert, evening party, child's ball, etc.), and the date of the event for the period 1851-75. In sum, I recorded 136 parties. Table 1 displays the means for number of invitations, excuses, and attendance conditional on the type of party.

[TABLE 1 HERE]

At first sight one can clearly see that balls are the largest and most common parties. On June 24th 1874, for example, one of these balls held at Buckingham Palace brought together almost 2,000 people. Concerts and evening parties were also regularly taking place at Buckingham. They both assembled similar numbers of people, but the latter displaying larger variance. Child's balls, which only took place six times in the studies period, were an opportunity for young adolescents and their parents for informal networking[20]. Finally, after the death of Prince Consort Albert, the Queen occasionally issued invitations for breakfast, afternoon parties, and official courts.

Figure 5 plots the total number of people attending to royal balls and parties over time, by party type. The initial year, 1851, displays unusually high attendence rates, explained by The Great Exhibition in the Christal Palace. After that, there seems to be an increasing time trend and some variation across years. In the early 50s balls and concerts were the only parties sponsored by the Queen, assembling between 4,000 and 5,000 people. By the 1870s this number increased to 6,000 persons, roughly a 33.33% more than in 1852. In 1872, for example, over 6,500 people dropped by Buckingham to attend large balls, evening parties, and other sort of social events. Not only the number of participants, but the variety of parties also increased, including invitations for breakfast or afternoon parties.

[FIGURE 5 HERE]

Interestingly, this evidence is useful to identify one clear disruption to the Season from 1861 to 1863. In December 1861, the Prince Consort Albert died. As part of the mourning, one of the Season most illustrious

[19] In detail, the references are LC 6/31-35 for the period 1839-76, and LC 6/127-156 for the remaining 1877-1902. Additional lists are also provided in LC 6/157-164.

[20] The Journals of Lady Knightley of Fawsley (1915) describe well how young children from the nobility and the gentry enjoyed Child Balls, and how their parents supervised their proceedings

traditions, presentation at Court of young ladies, was canceled (Ellenberger, 1990). This figure shows that not only court presentations, but also the parties held at Buckingham palace, were disrupted. No events were held at all in 1862, and only a concert was organized in 1863. Only by 1864 party attendance recovers levels seen in the mid 50s. Clearly, the evidence on royal parties reflect a disrupted Season due to the mourning, as is confirmed by anecdotal evidence:

> *"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 are intervals of the proverbial three days' visit".*
>
> Royal Places of England, various contributors, London: (1911).

# 6 Empirical Analysis

The theoretical exploration of marriage models displayed several clear predictions. Basically, as the market becomes more crowded and the encounter technology more efficient, the probability of "catching" a high type increases. Everyone becomes more picky and, thus, we see that more marriage classes are formed (Proposition 3). As a result of this, partners' characteristics will tend to be more homogeneous in equilibrium, in our case, in socioeconomic terms. This is precisely the effect that we expect from the London Season. The centralization of the marriage market in London, the large attendance of noble singles, and the improved "matching technology" embedded in events such as presentations at court, balls, and royal parties, all together increased the chances of meeting a *Mr. Darcy*[21]. Moreover, the centralization of the marriage market in London, bringing together young aristocrats from all over the country, should have clear cut effects on geographic endogamy (Observation 5). Thus, it is reasonable to expect that, in the golden age of the London Season in the 19th Century, the marriage outcomes of the *fashionable world* will display a large degree of marriage segmentation and social homogamy, and lower levels of geographic endogmay.

However, many things might be happening these years that confound the effect of the London Season marriage market on these patterns. That is why I will analyze in detail special situations in which the Season was not working smoothly to see whether the tendencies outlined for the golden days were reversed or deepened correspondingly. Formally, we seek to estimate the average treatment effect on the treated (ATT), that is, the effect of the London Season (treatment) on the marriage behaviour of the *fashionable world* (treated):

$$ATT = E\left[Y_{T=1}|T=1\right] - E\left[Y_{T=0}|T=1\right]$$

where $Y$ reefers to marriage behaviour (for example, social homogamy or geographic endogamy), and $T$ indicates the treatment: 1 if participated in the Season, 0 if she did not. Of course, the key here is to find an appropriate

[21] *Mr. Darcy* is one of the central characters in Jane Austen's *Pride and Prejudice*. He is described as the archetype of an attractive single, being (also) a very wealthy gentleman. His income is mentioned to be 10,000 pounds a year (chapter 59), and he is also owns a estate in Derbyshire

counter-factual for $E[Y_{T=0}|T=1]$. We need individuals which would, in general, participate in the Season normally but, for exogenous reasons, where less exposed to its matching technology. To this end, I will exploit two instruments: variations in the marriageable cohort size that affect participation rates to royal parties in the Season, and 18th century wars involving Britain.

## 6.1 The London Season golden days (1800-75)

Since the London Season is an institution that evolved in the 17C and 18C centuries, and in its traditional form it reached its golden days in the 19C, it is interesting to start by looking at the time profile of several marriage outcomes: homogamy, endogamy, and age at marriage. In particular, Figure 6 presents the time series for marriages outside the peerage (left panel), and the percentage endogamy for our three measures grouped by 20 year marriage cohorts (right panel). At first sight, one can distinguish differentiated patterns for the Season golden days. Social sorting, measured as the percentage of peer origin individuals marrying outside the peerage, stabilized around 70% between 1800-75 in contrast to the previous centuries, when it was raising steadily. After the 1870s, coinciding with the decline of the Victorian society (Ellenberger, 1990), marriages mixing peers and commoners began to grow again, and even at a sharper rate. With respect to geographic endogamy (similarity in geographical origin between spouses), the series display large volatility but no trend until the 19C, when it starts to go down.

[FIGURE 6 HERE]

Finally, Figure 7 illustrates the evolution of hazard rates per age group[22]. For all cohorts, men marry older than women. Over time, marriage is delayed and, for men, the 1840-59 cohort has a higher probability of marrying at almost every age group. It seems that the London Season produced more marriages, but not necessarily decreased age at marriage as agents became more picky. Interestingly, the first post Season cohort (1880-99) seems to lower hazard rates dramatically at all age groups for men, and at all age groups below 29 for women.

[FIGURE 7 HERE]

In sum, for both homogamy, endogamy, and age at marriage, the period 1800-75, the London Season golden years, presents distinctive features. Table 2 looks at this particularities in detail. From the social perspective, peers were a relatively closed group. Being a tiny group relative to the whole British population, not only they barely mixed with commoners, but they were quite segregative within themselves. Families holding a dukedom, earldom, or a marquessate married their daughters with sons from a family sharing the same rank, while viscount and baron families formed a separate marriage class. 22.88% of marriages were homogamous in this strict sense. These effects differ by sexes: women married less outside the peerage, but men married more within their rank.

[22]Hazard rates are calculated dividing the number of first marriages involving an individual at a particular age group by the total number of single agents at that age group: $\frac{\#\ first\ marriages_{age,cohort}}{\#\ single_{age,cohort}}$.

In opposition, the numbers for geographic endogamy are not that high. Considering county endogamy, we see that means do not exceed the 10%. When I enlarge the geographic unit with which to measure endogamy, the numbers grow, but only up to 25%. Dribe and Lundh analyze geographic exogamy for the rural population of five rural parishes in western Scania, Sweden, for the period 1815-95. Although the populations under analysis are very different from the British peers, the differences in geographic exogamy are striking: while 56% of the Swedish rural population in Scania married a spouse from the same or neighboring parish, only a 25% of British peer's married a peer origin spouse grown up in the same or neighboring county. On average, spouses came from seats as far as 220km away from one's home seat.

[TABLE 2 HERE]

Beyond unconditional means, a more sophisticated way to look at social homogamy is through contingency tables[23]. Table 3 shows the marriage outcomes of 2,570 males belonging to a peer family marrying between 1800 and 1875. The raw variable is husband's own social position at age 15, and the column variable is the highest rank ever achieved by the wife's parent. Each cell contains observed frequencies at the top, expected frequencies in case the two variables were independent in italics, and the difference between the two below[24]. Table 4 shows the same for 2,185 peer daughters, tabulating her parental rank (row) against her husband's social position at age 15.

At first sight, duke and baron heirs marry more than expected between themselves, and less than expected with those who were pure commoners at age 15, who seem to be totally restricted to mix with the peerage through marriage. This patterns account for most of the non random matching (98.5 of the aggregate Chi2). On the other hand, peer's younger sons marry significantly worst: duke's younger sons marry somehow randomly, while baron's younger sons are restricted to enter the peerage through marriage. Therefore, it could be said that there was also an elitist marriage behaviour among the peerage. For women, the deviations are concentrated at duke's daughter's marrying dukes, and baron's daughters marrying commoners. Compared to peer's younger sons, peer's daughters perform better on the marriage market

For both tables, the Chi2 test of independence shows that husband and wife rank were significantly related variables. In other words, during the London Season golden days marriage behaviour was far from random, but determined on the basis of social position. The strength of the relation between spouses' ranks is indicated by Cramer's V statistic. A value of 0.13 for men and 0.22 for women indicates that the relation is moderate to strong. Finally, both Kendall's tau-b and Goodman and Kruskal's G-test tell that the variables are positively related, that is, that most of the marriages are concentrated in the upper left and the bottom right corners. In other words, the best positioned individuals were getting the better ranked spouses. Formally, there was positive assortative

[23]For examples of the use of contingency tables for the study of historic marriage homogamy, see Dronkers and Schijft (2005), or Bodenhorn (2006).

[24]To calculate expected frequencies, we assume independence: $P(row_i \cap column_j) = P(row_i) \times P(column_j)$. Therefore, the expected frequencies in $cell_{ij}$ are equal to $\frac{marginaltotal_i}{grandtotal} \times \frac{marginaltotal_j}{grandtotal}$. Cell chi2 contributions are $\frac{(observed_{ij} - expected_{ij})^2}{expected_{ij}}$

matching with respect to social position.

[TABLES 3 AND 4 HERE]

I can do a similar exercise for geographic endogamy to see which classes marry spouses from further away. Table 5 displays percentage of endogamic marriages by social group for the period (1800-75). For all our geographic endogamy measures, individuals that were commoners at age 15, and thus that were less likely to participate in the London Season, are the ones presenting larger levels of geographic endogamy.

The Person chi2 test indicates that social class and the pattern of geographic endogamy are significantly related only for our division endogamy variable[25]. More interestingly, tau-b and G-test estimates show that the variables are negatively correlated. In other words, higher ranked individuals are less likely to marry spouses from their same division.

[TABLE 5 HERE]

## 6.2 Royal parties

Among all the social events embedded in the Season, royal parties where the most exclusive. Attendance to Queen sponsored concerts and balls at Buckingham signaled a high social position and opened the door for the most promising marriage prospects. For my purpose, attendance to royal parties is a useful measure of how intense the London Season was, and how smoothly its matching technology was working. Consider the case of Alan Stewart, heir of the earldom of Galloway, attending the Season in 1872, a year in which the Queen sponsored numerous events assembling a lot of people (Figure 5). Given how the central clearing house for marriages worked, marriages should display large levels of social sorting and low levels of geographic endogamy for those participating in highly attended Seasons. This was the case of Alan Stewart, who end up marrying Lady Arabella Arthur, daughter of the 2nd Marquess of Salisbury in 1872 and brought up in a seat 430 km away from Alan's home. In this section I will show that the sorting patterns for social position and endogamy not only coincide in time with the central clearing house for marriages, but are also meaningfully correlated with the number of participants to royal parties in the Season.

Table 6 (in the appendix) cross tabulates husband against wife social position for both the male and female sons of peers who married between 1851 and 1875. The sample is split in two according to whether they married in a year in which attendence to the Queen parties was large (above the mean[26]) or small (below). Results look quite similar across tables. As already described in the previous section, duke heirs marry much more duke daughters

[25]The fact that significance is reached when we consider endogamy according to the larger geographic unit makes sense if we take into account that country seats are quite isolated, many counties only having one seat.

[26]To be precise, in order to deal with the clear time trend illustrated in Figure 5, a year $18YY$ is considered to display large attendence if the assistance to Queen parties that year was larger than the mean for the period $18YY-3$ to $18YY+3$.

than spouses from commoner origin, while the younger sons of a baron show the opposite pattern. Duke daughters also marry much better positioned husbands than baron daughters. Interestingly, these effects are stronger when attendence to the Queen parties is larger. In other words, when the London Season was highly attended sorting increased, and it did so specially at the upper ties of the social distribution.

It is true that bachelors who were still commoners at age 15, at the bottom of the social distribution, were also performing slightly better when attendence rates were larger, although in any case they marry less dukes than expected. However, the majority of the variation in both tables is explained by duke heirs: half of the aggregate Pearson chi2 statistic comes from this category in both cases. In other words, social sorting in mainly determined by duke's behaviour, and we have seen that they mixed more with commoners when attendance rates were smaller. Apart from that, the behaviour of baron's younger sons, which also represent the lower tail of the social distribution as commoners at age 15, is in line with the hypothesis that larger attendence rates increased social sorting.

According to aggregate statistics, both subsamples show positive assortative matching with respect to social position, as it was common at the time. Again, aggregate statistics also support the positive correlation between sorting and attendence. The Gamma and Tau-b tests, indicating the sign of the relation between husband and wife class, display larger (more positive) values when attendence to royal parties is large. That is, there was more positive assortative matching in years in which more people attended royal parties.

[TABLE 6 HERE]

Since attendence to Queen parties is a continuous rather than a categorical variable, regression analysis may give a more precise picture of the raw correlations between royal parties and marriage outcomes. Moreover, by the use of regressions I will be able to control for various elements that may also influence social and geographic sorting, such as age at marriage, sex ratios, whether an individual holds a title from the English or the Irish peerage, or the time trends documented in previous figures.

Table 7 reports probit regressions for the probability of marrying outside the peerage and OLS for distance between spouses' seats, against the number of people attending Queen's parties in a given year. The regressions are for the equations

$$Pr\left(y_{i,t}=1|A_t,X_{i,t}\right)=\Phi\left(\mu+\alpha\ A_t+\mathbf{X}'_{i,t}\beta\right) \tag{4}$$

$$Distance_{i,t}=\nu+\gamma\ A_t+\mathbf{X}'_{i,t}\delta+\epsilon_{i,t} \tag{5}$$

where $y_{i,t}$ indicates whether individual $i$ at time $t$ married outside the peerage, and $Distance_{i,t}$ is the distance in km between spouses' seats. $\Phi(z)=\int_{-\inf}^{z}(2\pi)^{-1/2}exp(-z^2/2)$ is the cumulative distribution function of the standard normal distribution. $A_t$ is the number of people attending Queen parties at year $t$. On the other hand, $X_{i,t}$ is the vector of controls. Finally, the coefficient measuring the effect of the London Season "intensity" (measured as party

attendence) on marriage outcomes is $\alpha$.

The Season has a negative non linear effect on the probability of marrying a spouse from commoner origin. Just a 100 more people (not necessarily young children of marriageble age) attending Queen parties would decrease marriages outside the peerage by 0.3% for average types. Since the probit marginal effects are not linear, Figure 8 illustrates better the raw effect of the Season on social sorting. Marginal effect of the size of royal parties are plotted along its values. Clearly, the larger royal parties were, the greater its effect on social sorting. When royal parties are at their peak, increasing the number of participants reduced the probability of a peer to marry a commoner by 50% more than when parties are small. This result is in line with the increasing returns to scale characterization of the Season described before.

[FIGURE 8 HERE]

Consistently with the evidence from the cross tabulation statistics, class plays an important role in determining marriage outcomes. Duke heirs and duke daughters, that is, those in the upper extreme of the social distribution, are the ones marrying less outside the peerage. This is consistent with the segregative nature of marriage behaviour described above. For example, the probability of marrying a spouse of commoner origin is 21.2% larger for a duke younger son than for the heir of the family, for average values on all other observables. Controlling for the relative size of the social group rules out the possibility that these results come from a pure size effect. In fact, since the relative size coefficient is statistically insignificant, it is clear that marriage behaviour was far from random but the result of marriage strategies based on social position.

The remaining control variables have the expected sign and their inclusion does not change much the coefficients of interest previously described. Women marry worse positioned spouses than men. Older individuals, in a hurry to get married, are less selective. For an average age bachelor, growing a year older increases the chances of ending up with a commoner spouse around 0.5%, while for the avegare single girl the increase is about 0.4%[27]. Individuals coming from families entitled in the Scottish or Irish peerage also mix more with commoners than their English counterparts. Finally, imbalances in the sex ratio of individuals at marriageble age[28] might also affect marriage outcomes (Abramitzky et al., 2011). An excess of men reduces the probability of marrying outside the peerage for women, and increases it for men. Overall, the first effect dominates[29].

With respect to geographic endogamy, statistical significance is lost for many coefficients, but signs still tell a consistent story. Both baron heirs and duke younger sons marry spouses coming from closer places than duke heirs,

[27] Average marginal effects are non linear, so a 1 year change could change tha marginal effect itself, and thus the effect of growing older would only be evaluable at smaller time intervales (i.e, day, month). However, for this specification marginal effects are quite stable over yearly changes.

[28] As will be developed later on, the size of marriageble age individuals is defined as boys aged 23-28 and girls aged 19-24. See section 4.1 for details.

[29] Although not reported, the interaction effects of a dummy indicating sex and sex ratios will tell that story.

by 70 to 100km respectively. Again, controlling for relative size of the marriageble age population at a division level does not change the results, and it is not significant. The coeficient of interest here, that is, the numbers attending royal parties, does not have a significant effect on distance between spouses seats, although it has the correct sign: the larger the number of people attending the London Season, the more distant spouses come from. The remaining controls do not affect much the results. However, it is worth highlighting that Irish titles marry more distant spouses than their British counterparts[30].

[TABLE 7 HERE]

### 6.2.1 Marriage outcomes and London Season: IV results

The results in the previous sections show a meaningful correlation between the London Season and sorting patterns. Not only social homogamy peaked in the Season golden days, but also whenever the number of people attending royal parties increased, the probability of a peer children to marry outside the peerage decreased. On the other hand, the emergence of the Season is associated with a decrease in geographic endogamy. Larger parties are also associated with increases in the distance between spouses home seats, but not in a statistically significant manner.

However, these results have to be taken with a glance of caution. The fact that there exists a meaningful correlation does not tell us anything about causality. It could be argued, for example, that whenever marriage outcomes get worse from the nobility perspective, more and more parties are organized in order to bring back social sorting. In this case, equation 4 would suffer from reversed causality and thus results in Table 7 Panel A would be biased (Greene, 2012). Another potential endogeneity problem is the existence of an omitted variable driving both social sorting and the number of people attending Queen parties. Are both outcomes determined by the underlying economic factors that made the Victorian period the most prosperous for the British nobility and royalty? To establish a causality link between the Season and marriage outcomes, that is, to say that the Season actually brought Alan Stewart his well positioned, Hertfordshire native spouse, I need a source of exogenous variation in the number of people attending royal parties. An excellent instrument for this purpose is the size of the female population of marriageable age, since it affects marriage outcomes only through participation rates to the Season. The choice of females as the reference population is motivated by the key role that Presentations at Court played at the London Season. Young ladies aged 18, before the Season started, were to be presented to the Queen at St. James' Palace. This formal act symbolized the transition from childhood to adult life, in other words, it was a public announcement of which girls were already marriageable. Since information on the size of this side of the market seems to have been readily accessible, the described effect of larger cohorts attracting more people to London is better captured by the number of girls of marriageable age. Moreover, girls are not able to delay age at marriage as much as boys, therefore they are a more identifiable group for the my purpose.

[30] Even if Irish grooms were to be more geographically endogamous, this result might be explained by the fact that some Irish families attending the London Season might manage to marry their offspring to British spouses, increasing the *Distance* variable.

When a boom cohort enters the marriage market, participation rates to the Season burst, the number of people attending royal parties increases. Due to economies of scale, the central clearing house for marriages works smoothly. Positive assortative matching with respect to social position should be increased, reducing therefore marriages outside the peerage. Also, since the centralized marriage mart in London is working more efficiently, it "arranges" more marriages between singles who actually come from all over the country. As a result, matched spouses come from more distant places, decreasing geographic endogamy. Small cohorts, on the other hand, are exposed to a thin marriage market, so they won't enjoy as much the benefits of the economies of scale implied by the London Season centralization. Social sorting should go down as well as distance between spouses seats of origin. This "relevance" assumption is better illustrated by Figure 9, where I plot detrended attendence to royal parties against detrended size of the marriageable cohort. Clearly, for all years except for 1851 and the period of mourning for Prince Albert, there is a positive correlation between the two outcomes: larger cohorts brought larger parties.

[FIGURE 9 HERE]

$$\begin{array}{ccccccc} \textit{Size of the girls} & & \textit{Participation rates to} & & \textit{Efficiency of the} & & \textit{Social and geographic} \\ \textit{marriageble cohort} & \Longrightarrow & \textit{the Season royal parties} & \Longrightarrow & \textit{matching technology} & \Longrightarrow & \textit{sorting patterns} \end{array}$$

Importantly, this variation in cohort size is truly exogenous, since no one plans how many kids to have looking at the marriage market conditions 20 years ahead. Of course, this variation may have direct effects on marriage outcomes, but this comes only through observable variables. In particular, one may argue that cohort size may vary in a way such that sex ratios are affected, and thus I will control for them to maintain the exclusion restriction[31]. But apart from that, there is no direct effect of the marriageable cohort size on sorting patterns. Even though all the courtship of children of the Nobility took place in London, let's consider for a moment the alternative to the Season: local marriage markets. Since these markets do not display increasing returns to scale, balanced changes in the size of the marriageable cohort would not affect marriage patterns for those courting outside London. Botticini and Siow (2009) provide some evidence in support of this claim. They analyze descentralized marriage markets as the city and the countryside markets for the US, early renaissance Tuscany, and pre-reform China, finding no evidence of increasing returns to scale in the encounter function in any of these societies.

Apart from variations in the cohort size, other instruments have to taken into account. In particular, as it was inferred from Figures 5 and 9, two episodes affected exogenously the number of people attending royal parties: the Chrystal Palace fair in 1851, bringing a lot of people to London, and Price Albert's mourning, canceling HM Balls from 1861 to 1863, with no parties held at all in 1862.

[31] On the effect of sex ratios on marriage outcomes, see Abramitzky et al. (2011). Exploiting distorted sex ratios in France after WWI, they find that marriage outcomes of men improved more in regions which were more affected by war casualties. The effect of sex ratios here is somehow different, since the disruptions that variation in the cohort size might cause to sex ratios are much smaller, and adjustments should come only through adjusting age at marriage (Ní Bhrolcháin, 2001).

The number of people attending to Queen parties, $A_t$, is treated as an endogenous variable, and modeled as

$$A_t = \xi + \zeta_1 Cohort_t + \zeta_2 Fair_t + \zeta_3 Mourning_t + \mathbf{V}_t'\eta + \epsilon_t \tag{6}$$

where $Cohort_t$ is the number of girls at marriageable age, that is, between 19 and 24 years old[32], as it is it is inferred from Figure 10.

[FIGURE 10 HERE]

The remaining instruments consist on dummies indicating the two special events that affected the number of parties in 1851 and around 1862. $Fair_t$ corresponds to the 1851 Christal Palace fair, and $Mourning_t$ to the period of grief (1861-1863) for the death of the Prince Consort Albert[33]. $V_t$ is a vector of controls including alternative predictors for attendence rates to Queen parties, a time trend, and decade fixed effects.

Finally, it is also important to take into account that attendence rates will not necessarily go up if the cohort size is larger but does not grow balanced. That is, an excess supply of either men or women might discourage attendence to the London Season for singles on the longer side of the market. Therefore, sex ratios are also included as controls.

Table 8 Panel B gives the first stage coefficients resulting from estimating equation 6 by OLS with errors clustered at year level[34]. There is a positive significant (at p<10%) relation between the marriageble cohort size and attendance to royal parties. When the number of ladies at age of marriage increases in one girl, the number of people attending parties at Buckingham increases as much as 62. The other sources of exogenous variation in attendence rates to Queen parties, that is, the dummies indicating the Chrystal Palace fair and Price Albert's mourning, have the expected signs. In 1851 royal parties assembled around 3,000 more people than it would if the world fair had not taken place. Between 1861 and 1863, 3,500 people missed royal parties. The remaining controls do not have a significant effect. The model performs acceptably well according to the adjusted R-squared statistic. Over a 86% of the variance is explained by the model. The F-stest is also large enough to cross out any concern on weak instruments[35].

Panel A of Table 8 reports the second stage estimates of the coefficients of interest $\alpha$ and $\gamma$ from equations 4 and

[32]Note that here we consider the size of the marriage market, that is, all the people at marriageable age, not those who remain unmarried. The second, although a more precise measure of how many people was looking for a spouse at a given year, would be endogenous.

[33]To be precise, the period of grief does not include 1861, since Prince Albert died in December 1861. However, suffering of a stomach cramps, in the last year of his life he might not have been in the mood of sponsoring many parties, as it is reflected in Figure 5.

[34]To fit this triangular IV model, where both the treatment and the instrument only vary at a year level while marriage outcomes are measured at the individual level, I use the user written command cmp and cluster errors at a year level. The module cmp (conditional mixed processes) estimates (recursive) equation systems by using maximum likelihood (Roodman, 2007).

[35]According to Staiger-Stock's rule of thumb, an F-test over 10 is sufficient to rejct the corncern of weak instruments.

5[36]. Compared to the raw relationship, the second stage marginal effects[37] of party attendence on the probability of marrying out are increased. Figure 12 plots the marginal effects of attendance to royal parties evaluated along its values[38]. The figure looks similar to the raw average marginal effects, but shifted downward. A 100 people increase in the attendance to royal parties now reduces the probability of marrying outside the peerage by about 1%. Moreover, the larger royal parties were, the greater its (negative) effect on the probability for a peer to marry a commoner spouse.

[FIGURE 12 HERE]

The greatest change with respect to the raw relationships reported in Table 7 is on distance between spouses seats'. For average types, a 100 more people attending royal parties is reflected in a significant increase in the distance between matched spouses' seats by almost 3 km. As predicted, the Season not only increases social sorting between spouses, but also decreases geographic endogamy.

The coefficients for class do not change remarkably. The classes on the upper tie of the social distribution, that is, duke heirs and daughters, are the most homogamic ones. Their likelihood of marrying a spouse from commoner origin is lower. Commoners at age 15 are not statistically distinguishable from them, but the remaining classes are. The chances of marrying a commoner increase from baron heirs to duke younger sons, and from them to their baron counterparts. For geographic endogamy, duke heirs and daughters are the ones marrying spouses from further away, reflecting their higher exposure to the Season marriage market. In both specifications, relative size of group (social or geographical) does not play any role since, as it was mentioned before, marriage was not random but based on class and set up in the centralized market of London. The remaining control variables have similar effects and interpretations as before.

[TABLE 8 HERE]

### 6.3 18th century wars

The previous section established a causality link between the London Season matching technology and sorting patterns exploiting evidence on the number of people attending royal parties in the Season. Unfortunately, the period for which this evidence is available is limited to the second half of the 19th century. What about early Seasons? Can we extrapolate the previous causality link to the whole 19th century?

To answer these questions I will look at wars involving Britain as a disruption to the London Season, and check whether the marriage behavior was reversed consistently. Since wars have direct effects on marriage outcomes,

[36]That is, the results from estimating equations 4 and 5 with predicted attendence from the first stage.

[37]The Stata module cmp does not allow the computation of average marginal effects as reported in Table 7. However, marginal effects evaluated at the mean (i.e, computed fixing the value of independent variables to the sample mean) is an asymptotically valid approximation of average marginal effects (Greene, Econometric Analysis, pg. 876).

[38]And evaluated at the means of all the other variables

I will exploit time variation by comparing the distortions caused by wars before and after the Season was fully established.

The London Season was not disrupted by any war in its golden days. Therefore, I will have to go back to the early Seasons of the 18th and first years of the 19th century[39], a period plagued by long lasting conflicts involving Britain. Figure 13 shows the evolution of marriages outside the peerage, marriages within the same rank, and geographic endogamy for the 18th century, together with the disruptions caused by wars. At first sight, I can identify two different patterns for these disruptions. Wars in the first half of the century have the effect of increasing within rank marriages, decreasing marriages outside the peerage, and reducing geographic endogamy. On the other hand, wars in the second half of the century, that is, the Seven years war (1756-63), the American revolution (1775-83), and especially the Napoleonic wars (1793-1815), had the opposite effects.

[FIGURE 13 HERE]

As exposed in the theoretical analysis section, this differentiated pattern is explained by the larger development of the London Season in the second half of the 18th century. For the early 18th century, wars only disrupt marriage outcomes through the distortion of sex ratios: young men become scarce in war years, and thus they manage to marry up spouses of higher social position. This sex ratio effect will therefore decrease marriages within the same rank (Abramitzky et al., 2010). Moreover, as fewer men are available for marriage, I should expect a decrease in geographic endogamy, since more single ladies will be forced to travel all along the country to find a proper husband. On the other hand, as the London Season grows over the 18th century, another disruptive effect of wars appears: participation rates in the central marriage market are lower, and not much social events are organized as this would be seen as disrespectful for the fighting troops. All this makes the London Season matching technology work less efficiently, lowering positive assortative matching, decreasing marriage segregation between peers and commoners, and increasing geographic endogamy.

Table 9 displays the percentage of peers marrying down, within the same rank, and up conditional on a large military conflict being in place, all by marriage cohort.

[TABLE 9 HERE]

When a war is in place, male peers marry up more than in peacetime. This is true for all cohorts. As explained above, this is the result of distorted sex ratios. On the other hand, the percentage marrying within their same rank is ambiguously affected for most of the century. In general, less men marry within their class when a war is in place, but this effect is not significant until the last cohort. Moreover, in this last cohort, the drop in homogamy comes from male peers also marrying down commoner girls. This additional distortion can be explained by the fact that, by the end of the 18th century, when the London Season was already reaching its traditional form, wars also break

[39] Although in its traditional form the London Season peaked in the 19C, by the 18C it was already developing. See Pullar (1978) for a detailed explanation of the evolution of the London Season over centuries.

the segregation mechanism embedded in the Season[40].

To add up, Table 9 shows that homogamy is reduced during wars over all the period. At the early stages of the 18C, this reduction comes from an increase in men marrying up. By the end of the century, the reduction in homogamy comes from men marrying down commoners, which probably take advantage of an inefficient London Season unable to segregate peers and commoners.

With respect to geographic endogamy, Table 10 reproduces exactly the predictions stated before. From 1700 to 1785, when the Season was still developing, those who married in peacetime display larger levels of geographic endogamy. As argued above, this comes from the fact that in wartime, given the scarcity of bachelors, young girls were forced to travel all along the country to find a proper husband. On the other hand, from 1785 to 1835, with a fully implemented London Season, those marrying when the Napoleonic wars were in place do so more endogamously. In other words, as the central marriage market in London is distorted, more and more people recur to local marriage markets and, thus, geographic endogamy ends up increasing with respect to peacetime. In other words, over time, geographic endogamy is reduced more in peacetime than when a war was in place because in peacetime a centralized marriage market was developed in London, pooling young aristocrats from all over the country. When a war was in place, no matter if one considers the early 18th century or the beginning of the 19th, this mechanism was not at disposal.

[TABLE 10 HERE]

In conclusion, in this subsection I have seen that 18C wars distorted marriage outcomes, both in terms of social homogamy and geographic endogamy. However, the Napoleonic wars (1793-1815) did so in a different manner: geographic endogamy rose, and homogamy was distorted both because men managed to marry up but also because commoners managed to marry spouses from the peerage. This differentiated disruptive pattern is consistent with the existence of a centralized marriage market, the London Season, working as described for the golden days.

# 7 Conclusion and future research

The Season, working as a clearing house for marriages centralized in London, was a key institution to understand the sorting patterns of the British nobility. When it worked smoothly, that is, when it assembled large numbers of young singles in search for spouse, this marriage mart managed to rule out many marriages of peers with commoners, and also induced segregation between barons and dukes. In particular, a 100 more people attending Queen

[40]Of course, one may argue that the Napoleonic wars had this large disruptive effect just because it was the largest conflict in the 18C. That is right, but note that, for example, the effect of the Napoleonic wars in the percentage of peers marrying up is significantly lower than the effect of the war of Austrian succession (1840-48), also a large Europe wide conflict. Moreover, most of the decrease in homogamy comes from male peers marrying down, which would remain puzzeling even if one takes into consideration the larger dimension of the Napoleonic conflict.

parties (not necessarily in search for a spouse) decreased marriages outside the peerage by 1%. Moreover, the larger royal parties are, the greater this effect gets. This finding, in line with the increasing returns to scale hypothesis, perfectly reflects the nature of the Season as a central clearing house for marriages. As more people participated, contacts were made more frequently and, thus, noble children had more margin to wait until a good noble proposal came.

Moreover, the centralization of all marriage decisions in London also had effects in terms of geographic endogamy. When it worked properly, the Season allowed young aristocrats from all over the country to meet and court. As a result, one out of four couples were formed by spouses coming from very distinct geographic origins.

This findings indirectly shed some light on the debate over how opened the British ruling elite was. In this paper, it has been shown that the Season, acting as a segregative clearing house for marriages, was an important feature of the British high nobility. This is consistent with the view of a British elite quite closed to newcomers (Stone and Stone, 1984).

When the marriage mart was largely distorted by wars, marriage outcomes also reversed consistently. This implies that the effects of the Season on marriage outcomes come as soon as the late 18th century, and spreads out over a long period of roughly a hundred years until the royal parties of Queen Victoria.

This strong persistence leaves several doors opened for future research. In particular, it would be interesting to explore in deep the consequences of the implied sorting patterns on broader economic issues. Does the London Season evidence any aspect of the British nobility that may explain its unique economic and political performance in the nineteenth century? The British nobility ruled the country for its most prosperous period, accumulating a huge amount of wealth in their few hands (Cannadine, 1990), but by the end of the century the unexpectedly lost much of their influence. This can be explained by the sorting patterns implied by the Season from evolutionary theory point of view. We know that a specie practicing assortative mating reduces trait variance, making them stronger under the current enviroment, but less adaptable to changes in it. This seems to suit perfectly for the British nobility: while the political enviroment didn't change, the Season made them wealthy through assortative matching, but when this enviroment changed, it was too late for them to adapt. To explore this view I will pick the noble families in the 1870s and investigate where their wealth came from[41]. If I find a negative correlation between how assortatively their ancestors matched and their exposure to new industrial wealth, this story would hold.

Finally, another interesting extension to pursue would be to look at the Season from a political view. Was the Season a means for the Queen, who managed the important tradition of Court Presentations, to control the

[41] Evidence on land concentration upon the British nobility can be found in Bateman's *The Great Landowners of Great Britain and Ireland*.

nobility? In other words, was she using Court Presentations as a "carrot and stick"? Or was it, on the other hand, an auto imposed self constraint by the nobility to ensure their honest behaviour (Allen 2009)? Note that for a peer holding an office, the incentive to cheat would be reduced by the threat of loosing all his investment in making his sons and daughters look attractive in the Season.

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# A Figures

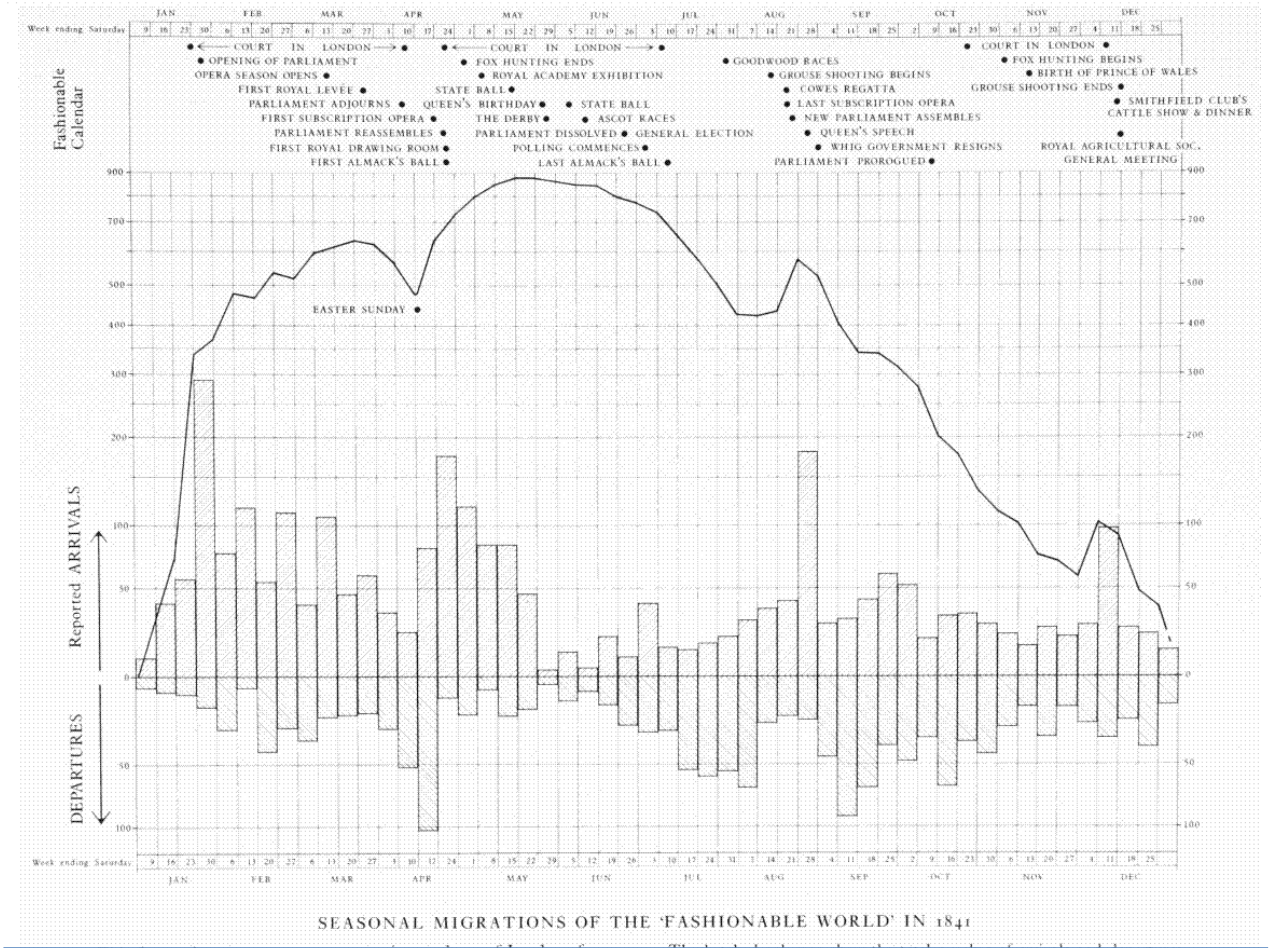



Figure 1: Seasonable Migrations of the Fashionable World in 1841

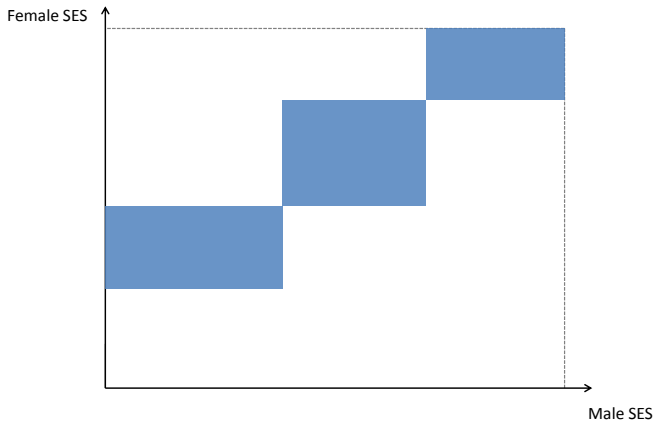



Figure 2: Equilibrium with fewer men

II. 1793. 2. ARTHUR (HILL), MARQUESS OF DOWNSHIRE, &c. [I.], also EARL OF HILLSBOROUGH, &c., 2nd but only surv. s. and h. by 1st wife, *b.* 23 Feb. 1753, at 15 Hanover Sq., Midx., *styled* VISCOUNT KILWARLIN, 1756-72, VISCOUNT FAIRFORD, 1772-89, and EARL OF HILLSBOROUGH, 1789-93; matric. at Oxford (Magd. Coll.) 18 May 1771 (as "Arthur Hill"), and was *cr.* M.A. 9 July 1773; sometime an officer in the army; M.P. (Tory) for Lostwithiel, 1774-80, for Malmesbury, 1780-84, being M.P. [I.] for co. Down,(c) 1776-93; Sheriff, co. Down, 1785; Grand Master of Freemasons [I.], 1785-87; Joint Registrar of the Court of Chancery [I.], 1786-1800; F.R.S. 21 Jan. 1790; Governor and Custos Rot. of co. Down 1793-1800; P.C. [I.] 7 Nov. 1793, sworn 23 Jan. 1794, but removed 18 Feb. 1800; took his seat in the House of Lords [I.] 21 Jan. 1794. He *m.* (spec. lic.), 29 June 1786, at St. Marylebone, Mary,(a) da. and h. of Col. the Hon. Martin SANDYS, by Mary, da. and h. of William TRUMBULL, of Easthampstead Park, Berks (and Mary, da. and coh. of Montague (BLUNDELL), VISCOUNT BLUNDELL [I.]). He *d.* 7 Sep. 1801, aged 48, of gout in the stomach, at Hillsborough.(b) Will pr. Feb. 1802. His widow, who was *b.* 19 Sep. 1764, having, on the death of her uncle, Edwin (SANDYS), 2nd BARON SANDYS OF OMBERSLEY, in 1797, *suc.* to the estates of that family, was *cr.*, 19 June 1802, BARONESS SANDYS OF OMBERSLEY, co. Worcester, with a spec. rem. of that Barony. She *d.* 1 Aug. 1836, after a long illness, at Downshire House, Roehampton, Surrey. Will pr. Sep. 1836.

Figure 3: Arthur Hill, Cockayne's peerage

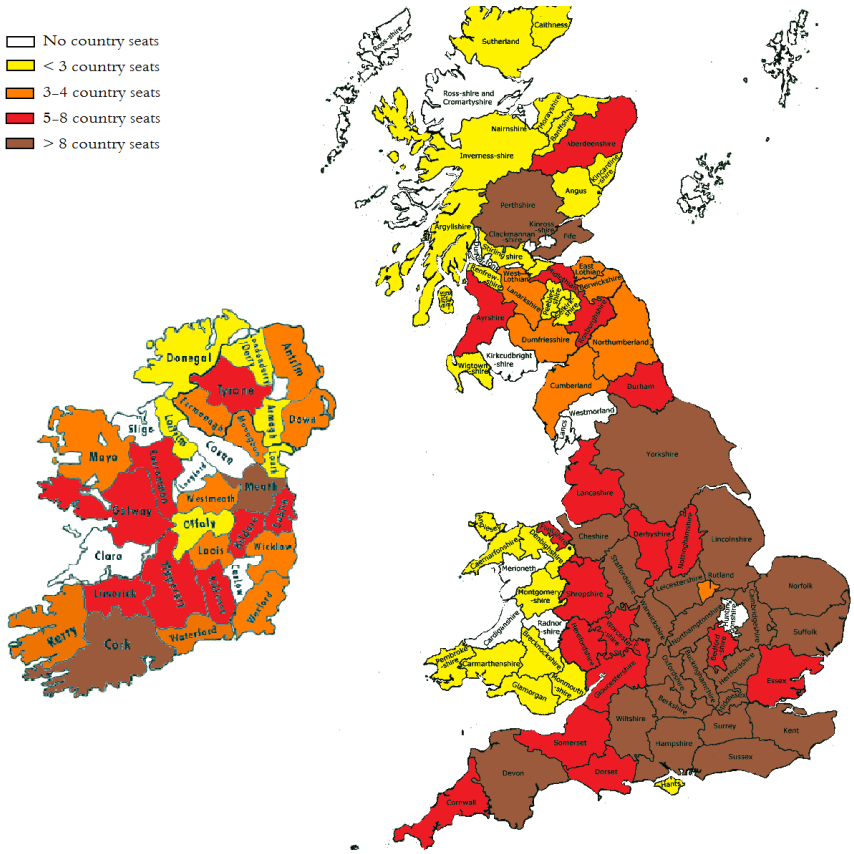



Figure 4: Country Seats per county

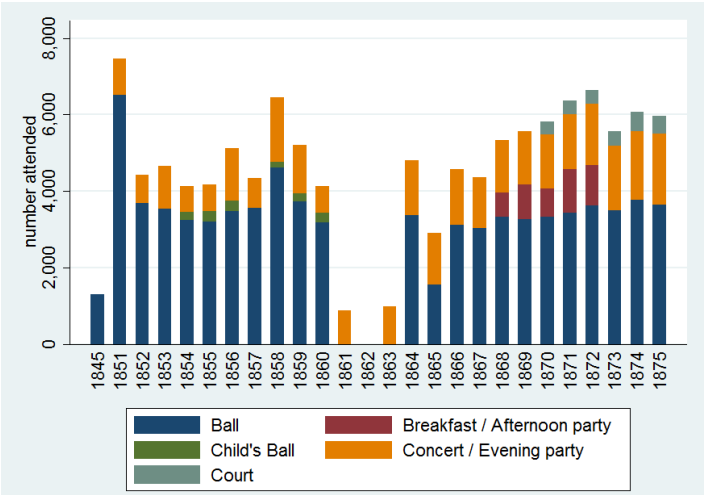



Figure 5: Numbers attending over time by party type


Figure 6: Social homogamy and geographic endogamy over time

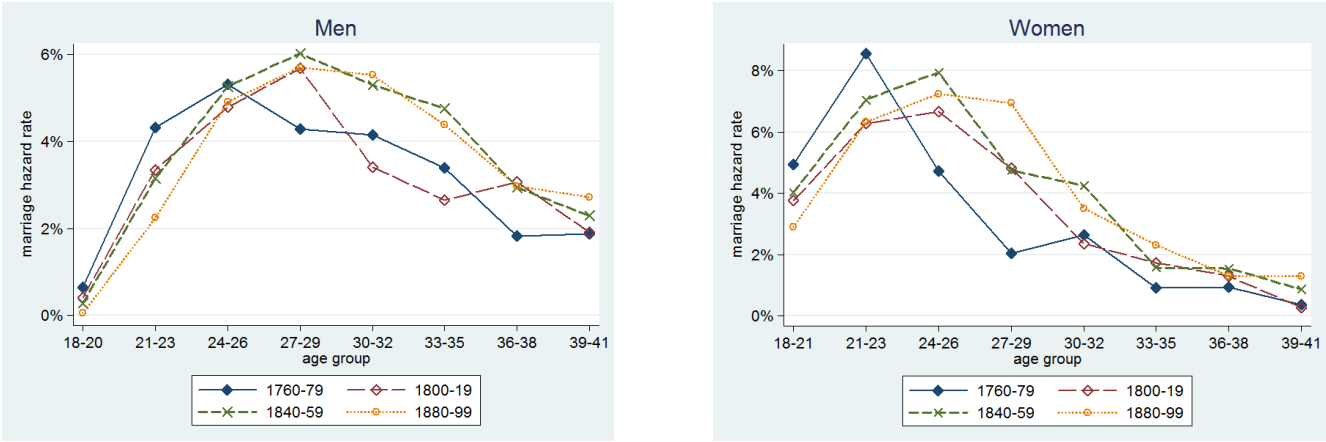



Figure 7: Hazard rates

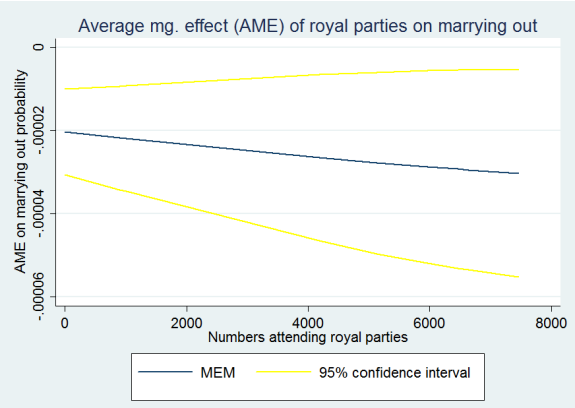



Figure 8: Raw average marginal effects (AME) of party attendance

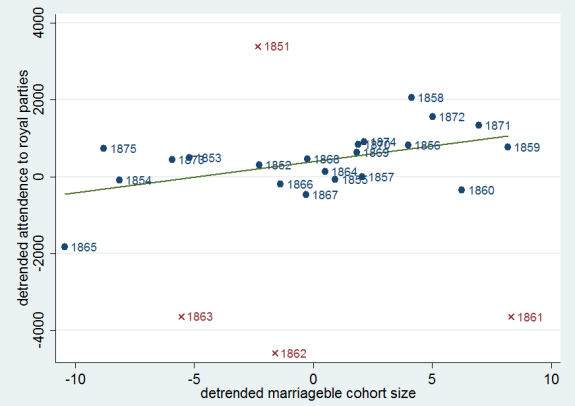



Figure 9: Relation between cohort size and royal parties

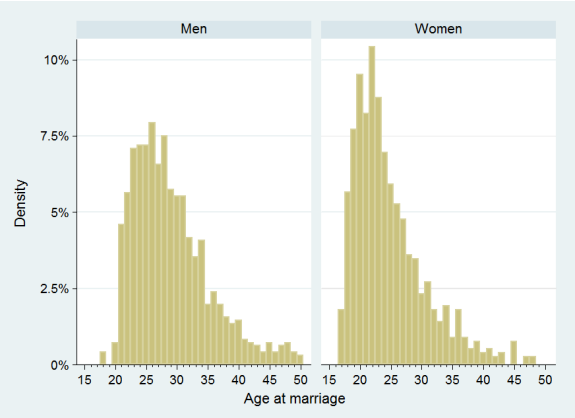



Figure 10: Distribution of age at marriage by sex (1851-75)

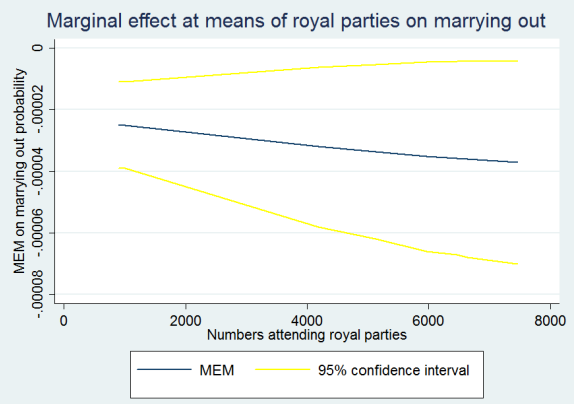
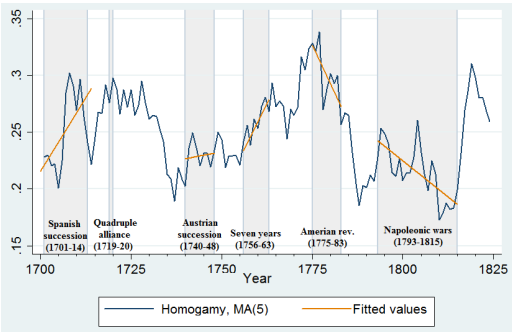
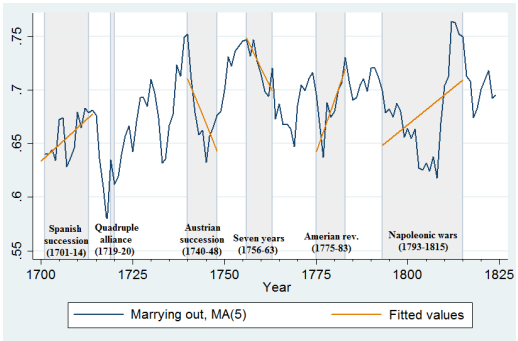



Figure 11: Marginal effects on means (MEM) of party attendance



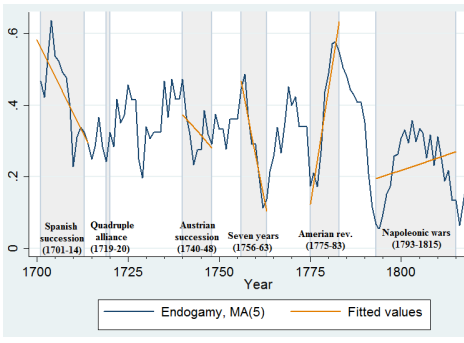




Figure 12: War disruptions over the century

# B Tables

Table 1 - Balls, Concerts, and Evening parties

| | | Invitations issued | Excused or Abroad | Attended | N |
|---|---|---|---|---|---|
| Type of party | Afternoon party | 632.5 | 105.5 | 527 | 2 |
| | | (140.7) | (21.9) | (118.8) | |
| | Ball | 1,792.9 | 109.2 | 1,683.3 | 47 |
| | | (160.6) | (42.9) | (172.7) | |
| | Breakfast | 915.5 | 43 | 847.5 | 4 |
| | | (226.2) | (26.1) | (215.2) | |
| | Child's Ball | 247.3 | 19.7 | 227.7 | 6 |
| | | (45.4) | (19.1) | (47.5) | |
| | Concert | 454.4 | 35 | 420.7 | 23 |
| | | (165.2) | (13.1) | (166.8) | |
| | Official Court | 487.5 | 96.3 | 392.5 | 6 |
| | | (93.28) | (30.2) | (69.8) | |
| | Evening party | 659.1 | 44.6 | 617.9 | 33 |
| | | (251.7) | (24.5) | (243.2) | |
| | Total | 1039.7 | 70.8 | 969.8 | 121 |
| | | (641.3) | (47.0) | (610.8) | |

Means on top, standard deviations in parenthesis.
LC Department, National Archives (LC 6/32-54).

Table 2: Unconditional means for the London Season golden days (1800-1875)

| | Men | Women | Total |
|---|---|---|---|
| Social Homogamy | | | |
| Marrying out the peerage | 73.15% | 66.02% | 69.89% |
| Marrying within same rank | 24.59% | 20.85% | 22.88% |
| N | 2615 | 2201 | 4816 |
| Geographic Endogamy | | | |
| Marrying within county | 9.73% | 9.86% | 9.79% |
| Marrying within division | 24.19% | 24.18% | 24.18% |
| Marrying within bordering county | 25.94% | 26.29% | 26.12% |
| Distance between spouses' seats | 225.2 | 221.6 | 223.3 |
| N | 399 | 427 | 826 |

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Burke, J. "A General Heraldic Dictionary" (1826)

Table 3 - Marriage strategies for men (1801-1875)

| | | Wife parental rank | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Foreign | Commoner | Knight | Baronet | Baron | Duke | Total |
| Husband's own rank | Commoner at age 15 | 19 | 261 | 11 | 21 | 37 | 54 | 403 |
| | | *18.19* | *231.14* | *12.07* | *33.71* | *35.91* | *71.98* | |
| | | 0.81 | 29.86*** | -1.07 | -12.71** | 1.09 | -17.98** | |
| | Baron younger son | 39 | 500 | 17 | 72 | 59 | 71 | 758 |
| | | *34.21* | *434.74* | *22.71* | *63.41* | *67.54* | *135.38* | |
| | | 4.79 | 65.26*** | -5.71 | 8.59 | -8.54 | -64.38*** | |
| | Duke younger son | 36 | 434 | 27 | 68 | 55 | 132 | 752 |
| | | *33.94* | *431.3* | *22.53* | *62.91* | *67.01* | *134.31* | |
| | | 2.06 | 2.7 | 4.47 | 5.09 | -12.01* | -2.31 | |
| | Baron | 9 | 150 | 10 | 31 | 42 | 64 | 306 |
| | | *13.81* | *175.5* | *9.17* | *25.6* | *27.27* | *54.65* | |
| | | -4.81 | -25.5*** | 0.83 | 5.4 | 14.73*** | 9.35 | |
| | Duke | 13 | 129 | 12 | 23 | 36 | 138 | 351 |
| | | *15.84* | *201.31* | *10.52* | *29.36* | *31.28* | *62.69* | |
| | | -2.84 | -72.31*** | 1.48 | -6.36 | 4.72 | 75.31*** | |
| | Total | 116 | 1,474 | 77 | 215 | 229 | 459 | 2,570 |
| Cross tabulation statistics | | | | | Person 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 | |

Observed frequencies on top ($O$), expected frequencies if the two variables were independent ($E$) in italics, and difference ($O - E$) below

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

Table 4 - Marriage strategies for women (1801-1875)

| | | Husband's own rank | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Common age 15 | Baron son (no heir) | Duke son (no heir) | Knight | Baronet | Baron | Duke | Total |
| Wife | Baron daughter | 617 | 30 | 38 | 46 | 86 | 106 | 80 | 1,037 |
| | | *526.33* | *28.48* | *57.9* | *36.54* | *88.8* | *117.7* | *147.6* | |
| | | 90.67*** | 1.52 | -19.9*** | 9.46** | -2.75 | -11.7 | -67.6*** | |
| | Duke daughter | 492 | 30 | 84 | 31 | 101 | 142 | 231 | 1,148 |
| | | *582.67* | *31.52* | *64.1* | *40.46* | *98.25* | *130.3* | *163.4* | |
| | | -90.67*** | -1.52 | 19.9*** | -9.46** | 2.75 | 11.7 | 67.6*** | |
| | Total | 1,109 | 60 | 122 | 77 | 187 | 248 | 311 | 2,185 |
| Cross tabulation statistics | | | | | | Person 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 | |

Observed frequencies on top ($O$), expected frequencies if independence ($E$) in italics, and difference ($O - E$) below

Marriages with a foreign husband not reported

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

Table 5 - Percentage geographic endogamy by social group (1800-75)

| | County endogamy | | Border endogamy | | Division endogamy | | N |
|---|---|---|---|---|---|---|---|
| Commoner at age 15 | 12.90 | | 29.03 | | 35.48 | | 23 |
| Baron daughter | 7.89 | | 30.70 | | 30.70 | | 78 |
| Baron younger son | 4.92 | | 16.39 | | 16.39 | | 46 |
| Baron | 9.09 | | 24.24 | | 24.24 | | 48 |
| Duke daughter | 10.48 | | 24.44 | | 21.59 | | 214 |
| Duke younger son | 9.76 | | 28.46 | | 28.46 | | 76 |
| Duke | 10.00 | | 26.15 | | 19.23 | | 88 |
| Total | 9.52 | | 25.71 | | 24.26 | | 573 |
| Cross tabulation statistics | | | | | | | |
| Pearson $chi^2(6)$ | 2.65 | Pr=0.85 | 5.28 | Pr=0.51 | 10.99 | Pr=0.09 | |
| Cramer's V | 0.06 | | 0.08 | | 0.11 | | |
| Gamma | -0.00 | ASE=0.09 | -0.03 | ASE=0.06 | -0.09 | ASE=0.06 | |
| Kendall's tau.b | -0.00 | ASE=0.03 | -0.02 | ASE=0.03 | -0.05 | ASE=0.03 | |

All figures in percentages, except N in levels

Table 6 - Husband's social position x Wife social position x Attendence to Queen's parties

| | | Small attendence to Queen's parties | | | | | | Large attendence to Queen's parties | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Wife parental rank | | | | | | Wife parental rank | | | | | |
| | | Foreign | Common | Knight | Baronet | Baron | Duke | Foreign | Common | Knight | Baronet | Baron | Duke |
| Husband's rank | Commoner | -1.09 | 11.51*** | -2.21 | -3.19 | 1.99 | -7.01*** | 1.47 | 8.48* | 0.54 | -3.74 | -2.38 | -4.36 |
| | | (-0.69) | (3.199) | (-1.639) | (-1.462) | (1.006) | (-2.621) | (0.62) | (1.801) | (0.33) | (-1.56) | (-0.87) | (-1.196) |
| | Baron younger | 1.82 | 11.02** | -0.42 | 0.63 | -3.01 | -10.03*** | 4.13 | 8.37 | -0.99 | 3.84 | -0.98 | -14.37*** |
| | | (0.891) | (2.381) | (-0.241) | (0.225) | (-1.183) | (-2.914) | (1.544) | (1.572) | (-0.537) | (1.417) | (-0.316) | (-3.484) |
| | Duke younger | -1.49 | -5.42 | 0.37 | 4.03 | -1.5 | 4 | 0.6 | 1.3 | 1.22 | 2.32 | -1.34 | -4.11 |
| | | (-0.719) | (-1.155) | (0.21) | (1.419) | (-0.58) | (1.147) | (0.227) | (0.248) | (0.669) | (0.867) | (-0.436) | (-1.009) |
| | Baron heir | 0.11 | -6.2* | 0.93 | -0.79 | 4.32** | 1.63 | -3.6** | -2.36 | 1.35 | -1.7 | 2.04 | 4.27 |
| | | (0.069) | (-1.773) | (0.712) | (-0.371) | (2.24) | (0.627) | (-2.067) | (-0.68) | (1.119) | (-0.963) | (1.01) | (1.591) |
| | Duke heir | 0.66 | -10.91*** | 1.33 | -0.69 | -1.8 | 11.41*** | -2.6 | -15.8*** | -2.11 | -0.72 | 2.66 | 18.57*** |
| | | (0.466) | (-3.411) | (1.107) | (-0.356) | (-1.02) | (4.798) | (-1.341) | (-4.094) | (-1.578) | (-0.369) | (1.184) | (6.215) |
| | | Husband own rank | | | | | | Husband own rank | | | | | |
| | | Common | Baron son | Duke son | Knight | Baronet | Baron | Duke | Common | Baron son | Duke son | Knight | Baronet | Baron | Duke |
| Wife father's rank | Baron | 16.96*** | -0.93 | -6.8*** | -1.89 | -2.16 | 2.33 | -8.58*** | 23.75*** | 2.51 | -4.97* | 4.52** | 0.54 | -11.93*** | -13.44*** |
| | | (3.737) | (-0.664) | (-3.002) | (-1.112) | (-0.755) | (0.822) | (-2.728) | (4.434) | (1.533) | (-1.938) | (2.021) | (0.185) | (-3.174) | (-3.804) |
| | Duke | -16.96*** | 0.93 | 6.8*** | 1.89 | 2.16 | -2.33 | 8.58*** | -23.75*** | -2.51 | 4.97* | -4.52** | -0.54 | 11.93*** | 13.44*** |
| | | (-3.737) | (0.664) | (3.002) | (1.112) | (0.755) | (-0.822) | (2.728) | (-4.434) | (-1.533) | (1.938) | (-2.021) | (-0.185) | (3.174) | (3.804) |
| Cross tabulation stats | | | | | Pearson chi2(42) | | 132.258 | Pr = 0.00 | | | | Pearson chi2(42) | | 168 | Pr = 0.00 |
| | | | | | LR chi2(42) | | 119.673 | Pr = 0.00 | | | | LR chi2(42) | | 153.298 | Pr = 0.00 |
| | | | | | Cramr's V | | 0.171 | | | | | Cramr's V | | 0.165 | |
| | | | | | gamma | | 0.254 | ASE=0.04 | | | | gamma | | 0.266 | ASE=0.036 |
| | | | | | Kendall's tau-b | | 0.182 | ASE=0.029 | | | | Kendall's tau-b | | 0.193 | ASE=0.026 |

Differences between observed and expected frequencies if the wife and husband rank were independent variables. Adjusted residuals in parenthesis.

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

Marriages of peer daughters with foreign husbands not reported

Table 7 - Marriage outcomes and the London Season. Raw relationships.

| | Marrying Out | | Distance | |
|---|---|---|---|---|
| | *average mg.effect* | *std.error* | *coefficient* | *std.error* |
| Number attending royal parties | -.00003*** | ($9.9e^{-6}$) | 0.010 | (0.012) |
| Commoner at age 15 | .132 | (.129) | 44.23 | (69.64) |
| Baron younger son | .285*** | (.018) | -20.05 | (63.67) |
| Duke younger son | .212*** | (.028) | -101.69*** | (28.99) |
| Baron heir & daughter | .179*** | (.017) | -77.70*** | (21.19) |
| Duke heir & daughter | ref. | | ref. | |
| Relative size | -.560 | (.474) | 0.86 | (1.91) |
| Age at marriage | .005** | (.002) | 2.93 | (2.26) |
| Woman | .103*** | (.025) | -17.68 | (19.47) |
| Men | ref. | | ref. | |
| Sex ratio (men/female) | -.457** | (.176) | 288.02 | (299.63) |
| Irish peerage | .067*** | (.021) | 62.63** | (22.46) |
| Scottish peerage | .103*** | (.029) | 46.60 | (38.08) |
| English peerage | ref. | | ref. | |
| Trend | .015*** | (.015) | -2.59 | (4.32) |
| Decade controls | yes | | yes | |
| Constant | yes | | -136.84 | (344.72) |
| N | 1,747 | | 335 | |
| % correctly predicted | 71.49 | | | |
| Pseudo-R2 / Adjust-R2 | 0.076 | | 0.073 | |

Robust std. errors in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Panel A: Second-Stage Least Squares

| | Marrying Out | | | Distance between spouses seats' (km) | |
|---|---|---|---|---|---|
| | *coefficient* | *s.e.* | *mg. effect at the mean* | *coefficient* | *s.e.* |
| # attending royal parties | -9.76$e^{-5}$** | (.000) | -0.0001 | .0295** | (.0133) |
| Commoner at age 15 | 0.469 | (.543) | 0.469 | 51.3 | (66.7) |
| Baron younger son | 1.176*** | (.142) | 1.176 | -15.4 | (59.6) |
| Duke younger son | 0.796*** | (.147) | 0.796 | -105.6*** | (28.9) |
| Baron heir/daughter | 0.612*** | (.074) | 0.612 | -80.1*** | (21.6) |
| Duke heir/daughter | ref. | | | ref. | |
| Relative size | -1.743 | (1.52) | -1.743 | 0.6 | (1.9) |
| Age at marriage | 0.0151** | (.007) | .015 | 2.1 | (2.2) |
| Woman | 0.333*** | (.093) | .333 | -22.9 | (19.8) |
| Man | ref. | | ref. | ref. | |
| Sex ratio (men/women) | -1.727** | (.694) | -1.727 | 625.5* | (333.5) |
| Peerage of Ireland | 0.217*** | (.075) | .217 | 68.2*** | (22.4) |
| Peerage of Scotland | 0.354*** | (.118) | .354 | 42.1 | (37.6) |
| Peerage of England | ref. | | | ref. | |
| Trend | 0.0522*** | (.018) | .052 | -7.2 | (5.4) |
| Decade dummies | yes | | | yes | |
| Constant | 1.231 | (1.06) | | -479.4 | (356.7) |
| N | 1,774 | | | 340 | |
| Clusters | 25 | | | 25 | |
| % correctly predicted | 71.38 | | | | |

Panel B: First Stage for attendence to HM parties against cohort size

| | Number attending royal parties | | | | | |
|---|---|---|---|---|---|---|
| | *coefficient* | *s.e.* | *coefficient* | *s.e.* | *coefficient* | *s.e.* |
| Marriageble cohort size | 40.44*** | (10.30) | 40.03*** | (9.78) | 62.28** | (28.02) |
| Prince Albert mourning | -4,325*** | (442.89) | -4,440*** | (425.0) | -3,553*** | (837.12) |
| Chrystal Palace fair | 3,474*** | (783.69) | 3,722*** | (756.1) | 3,220*** | (811.37) |
| Sex ratio (men/women) | | | 3,760* | (2,065) | -1,866 | (3,926.78) |
| Trend | | | | | -26.41 | (107.55) |
| Decade dummies | no | | no | | yes | |
| Constant | -5,597* | (2,724.21) | -9,170** | (3,246) | -8,883 | (7,485.00) |
| N | 25 | | 25 | | 25 | |
| Adjusted R2 | 0.844 | | 0.859 | | 0.866 | |
| F-test | 44.28 | | 37.70 | | 23.15 | |

Robust standard errors in parentheses

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

Marginal effects computed with values of the independent variables fixed at sample means.

Table 9 - War disruptions over time for male peers

| | | Marrying down | | | Marry. within rank | | | Marrying up | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | war | peace | diff. | war | peace | diff. | war | peace | diff. |
| Marriage cohort | 1700-24 | 45.73 | 52.05 | -6.32 | 20.48 | 20.47 | 0.01 | 33.79 | 27.49 | 6.30 |
| | | | | (0.047) | | | (0.042) | | | (0.044) |
| | 1725-49 | 52.05 | 56.77 | -4.72 | 16.96 | 20.00 | -3.04 | 30.99 | 23.23 | 7.76*** |
| | | | | (0.047) | | | (0.041) | | | (0.042) |
| | 1750-74 | 54.1 | 54.5 | -0.38 | 23.53 | 24.50 | -0.97 | 22.35 | 21 | 1.35 |
| | | | | (0.046) | | | (0.042) | | | (0.038) |
| | 1775-99 | 54.35 | 56.78 | -2.43 | 22.69 | 19.49 | 3.2 | 22.96 | 23.73 | -0.77 |
| | | | | (0.041) | | | (0.037) | | | (0.035) |
| | 1799-25 | 59.15 | 53.82 | 5.33* | 13.4 | 21.37 | -7.97** | 27.45 | 24.81 | 2.64 |
| | | | | (0.038) | | | (0.033) | | | (0.034) |
| | Total | 53.88 | 54.97 | 1.09 | 18.75 | 21.54 | -2.79 | 27.38 | 23.5 | 3.88*** |
| | | | | (0.019) | | | (0.016) | | | (0.016) |

Standard errors in parenthesis. All statistics in percentage, except for std errors in levels. *** p<0.01, ** p<0.05, * p<0.1.
Wars considered are large European conflicts in the 18C: Spanish succession (1701-14), Quadruple alliance (1717-20), Austrian succession (1740-48), Seven years war (1756-1763), American revolution (1775-1783), Napoleonic wars (1773-1815).

Table 10 - Geographic endogamy conditional means

| | | War | Peace | |
|---|---|---|---|---|
| Cohort married | 1700-1785 | 30.39% | 34.88% | -4.49% |
| | | | | (.049) |
| | 1785-1835 | 25.38% | 22.15% | 3.23% |
| | | | | (.036) |
| | | -8.24% | -9.5%*** | |
| | | (.043) | (.042) | |

Endogamy measured as spouses coming from the same division
Standard errors in parenthesis
All statistics in %, except for std. errors in levels
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

# C Proofs

This Appendix presents all the proofs omitted in the paper.

**Proof.** This is the proof of Proposition 3 (Segmentation).

Assume, for ease of exposition, that the two populations are symmetric ($P_i = P$, $R_{n,i} = R_n$ $\forall n$ and for $i = m, w$)

First show that $R_n \geq R'_n$ $\forall n = 1, ..., N$ and $R_n > R'_n$ for some $n$.

The proof goes by induction.

1. Basis Step ($n = 1$). Consider the most charming woman (also holds for the most charming man).

$$R_1 = \frac{\beta}{1-\beta}\alpha(P)\int_{R_1}^{\overline{x}}(1 - G(z))dz$$

and

$$R'_1 = \frac{\beta}{1-\beta}\alpha'(P)\int_{R'_1}^{\overline{x}}(1 - G(z))dz$$

are the corresponding reservation strategies under $\alpha$ and $\alpha'$.

Proof by contradiction that $R_1 > R'_1$. Suppose $R_1 \leq R'_1$. Then,
$\frac{\beta}{1-\beta)}\alpha(P)\int_{R_1)}^{\overline{x}}(1 - G(z))dz > \frac{\beta}{1-\beta}\alpha'(P)\int_{R'_1)}^{\overline{x}}(1 - G(z))dz$ since $R_1 \leq R'_1$ and $\alpha > \alpha'$.
But this implies $R_1 > R'_1$, which gives the contradiction.

2. Assume that for $n$, $R_n \geq R'_n$ whenever $\alpha > \alpha'$.

3. Inductive step.

$$R_{n+1} = \frac{\beta}{1-\beta}\alpha(P)\int_{R_{n+1}}^{R_n}[G(R_n) - G(z)]dz$$

and

$$R'_{n+1} = \frac{\beta}{1-\beta}\alpha'(P)\int_{R'_{n+1}}^{R'_n}[G'(R_n) - G'(z)]dz$$

are the reservation strategies under $\alpha$, $g(\underline{x})$ and $\alpha'$, $g'(\underline{x})$.

Proof by contradiction that $R_{n+1} > R'_{n+1}$. Suppose $R_{n+1} \leq R'_{n+1}$. Note that $\alpha > \alpha'$, $R_n \geq R'_n$, and $R_{n+1} \leq R'_{n+1}$. Note also that, since $g$ and $g'$ are identical except for the lower tail $G'(z) \geq G(z) \forall z$, and $1-G(R_n) = 1-G'(R_n) < 1-G'(R'_n)$ implying $G'(R'_n) < G(R_n)$. Therefore $\frac{\beta}{1-\beta}\alpha(P)\int_{R_{n+1}}^{R_n}[G(R_n)-G(z)]dz > \frac{\beta}{1-\beta}\alpha'(P)\int_{R'_{n+1}}^{R'_n}[G(R_n) - G(z)]dz$. But this implies $R_{n+1} > R'_{n+1}$, which gives the contradiction.

Now it clearly follows that also $N \geq N'$. ■