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**The Downton Abbey Effect: 18th and  
19th Century British Aristocratic  
Marriages and Agricultural Prices**

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## Abstract

In the four decades leading up to World War I, a significant proportion of British aristocrats married daughters of newly rich American business magnates. I provide a quantitative economic analysis of this phenomenon in the deeper context of British aristocratic marriages during the 18th and 19th centuries. I show that the decline in agricultural prices, particularly acute during the British agricultural depression of the late 19th century, by reducing the income of aristocratic landed estates at the same time as it reduced the income of landed families, led to richly dowried American brides being substituted for brides from British landed families, the traditional source of brides entering the aristocracy. I also show that this was part of a wider phenomenon of aristocratic substitution of foreign brides for landed brides during the whole of the 19th century, as well as the substitution of daughters of British businessmen for daughters of landed families in aristocratic marriages during both centuries, when agricultural prices declined. The results are consistent with a theory of positive assortative matching in the aristocratic marriage market with lump-sum transfers, where cash-constraints are placed on lump-sum transfers (dowries) from the landowning families of potential brides in periods of agricultural downturn.

JEL Classification: D10, J10, J12, N00, N53

Keywords: Aristocracy, agricultural depression, Marriage, dowry, assortative matching

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# The Downton Abbey Effect: 18<sup>th</sup> and 19<sup>th</sup> Century British Aristocratic Marriages and Agricultural Prices

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*Abstract:* In the four decades leading up to World War I, a significant proportion of British aristocrats married daughters of newly rich American business magnates. I provide a quantitative economic analysis of this phenomenon in the deeper context of British aristocratic marriages during the 18<sup>th</sup> and 19<sup>th</sup> centuries. I show that the decline in agricultural prices, particularly acute during the British agricultural depression of the late 19<sup>th</sup> century, by reducing the income of aristocratic landed estates at the same time as it reduced the income of landed families, led to richly dowried American brides being substituted for brides from British landed families, the traditional source of brides entering the aristocracy. I also show that this was part of a wider phenomenon of aristocratic substitution of foreign brides for landed brides during the whole of the 19<sup>th</sup> century, as well as the substitution of daughters of British businessmen for daughters of landed families in aristocratic marriages during both centuries, when agricultural prices declined. The results are consistent with a theory of positive assortative matching in the aristocratic marriage market with lump-sum transfers, where cash-constraints are placed on lump-sum transfers (dowries) from the landowning families of potential brides in periods of agricultural downturn.

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EARL GRANTHAM: Do you think she would've been happy with a fortune hunter?

COUNTESS GRANTHAM: She might've been. I was.

*Downton Abbey, Series 1, Episode 1*

## 1. Introduction

Lady Cora's mild rebuke of her husband's hypocrisy in the opening episode of the internationally highly popular TV series *Downton Abbey* (Fellowes, 2012) is designed to remind him that it was the handsome dowry she brought with her, when she relocated in the 1880s from her native industrial Pittsburgh to rural Yorkshire to marry into the British aristocracy, that had saved the eponymous stately home and Earl Grantham's family from financial ruin a quarter of a century earlier. Another work of historical fiction, Edith Wharton's novel, *The Buccaneers*, published posthumously in 1938, chronicles the story of four American women from newly rich families who marry into the British aristocracy during the late 19<sup>th</sup> century. These fictional storylines are, however, based on a real-world trend that ran through four decades until the outbreak of World War I, during which period one hundred American business magnates' daughters were wedded to titled members of the British aristocracy: <sup>2</sup> forty to younger sons of aristocrats, sixty to eldest sons and heirs to titles, and six to holders of the very highest aristocratic rank of duke (Montgomery, 1989; De Courcy, 2017); or, calculated another way, 'Between 1870 and 1914, fully 10 percent of [male] aristocratic marriages followed this novel pattern' (Cannadine, 1990, p. 347).<sup>3</sup> Given that the British aristocracy was generally regarded as

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<sup>2</sup> I use the term 'aristocracy' in this paper to denote hereditary British lords, i.e. hereditary members of the British House of Lords during the period under analysis. This includes the five categories of hereditary lordship titles (in order of descending rank from highest to lowest): duke, marquess, earl, viscount and baron. All of these titles are lordships. The title of baronet, holders of which may be styled 'Sir', ranks below baron, is not a lordship and at no time carried with it the right to sit in the House of Lords. A knighthood, ranked below a baronetcy, is similarly not a lordship and while a knight may also be styled 'Sir', their title is conferred on them as a lifetime appointment. I exclude baronets and knights from my definition of the aristocracy. I use the term 'peerage' as synonymous with 'aristocracy' and 'peer' as synonymous with 'lord'. I use the term 'commoner' to denote a British person without any title at all, i.e. anyone who was not a British lord, baronet or knight.

<sup>3</sup> Entry into the aristocracy was limited to females marrying aristocratic males because the wife would assume an aristocratic title and the issue of the resulting union would become part of the aristocratic bloodline, with the aristocratic family name and any inherited titles. Marrying even a younger son of a duke or marquess would entail carry a non-hereditary courtesy title or prefix (the son being styled 'Lord' and his wife 'Lady') and considerable prestige and access to high social circles. On the other hand, daughters of aristocratic families who married commoners would be leaving the aristocracy; see Schutte (2014) for an historical analysis of the pattern of marriages of aristocratic daughters.

the most exclusive club in the world outside of the British royal family, this is a remarkable phenomenon, which I investigate in this paper. My central hypothesis is that the accelerated decline in agricultural prices in the late 19<sup>th</sup> century, which reduced the income of aristocratic landed estates at the same time as it reduced the income of the British untitled landed families, led to richly dowried American brides being substituted for women from untitled landed families—traditionally the chief source of women marrying into the British aristocracy. As noted by Stone (1961), for example, the tradition among the British aristocracy was not to fix the marriage settlement according to any fixed tariff but rather to allow it to be determined by ‘the simple factor of the laws of supply and demand’, including both the extent of the marriage market and the willingness to pay of the father of the bride, an important determinant of which would have been, for landed families at least, their estate income. The late 19<sup>th</sup> century trend for American heiresses to marry into the aristocracy has previously been linked informally to the coincident British agricultural depression. Thompson (1963, p. 303), for example, notes:

The general impression is that down to 1914 it remained normal for the aristocracy to marry within their own circle, choosing daughters of landed families or joining with the allied groups of generals’ or parsons’ daughters, but that alliance with wealthy new families, English or foreign, was increasingly common. The need for injections of new wealth, after all, was clearly on the increase.

However, the concomitant decline in the proportion of daughters of untitled landed families joining the aristocracy, implying a trade-off or substitution effect, has not previously been highlighted or investigated quantitatively in this context. Further, I show that this phenomenon extended to a substitution effect between landed brides and foreign brides more generally for the whole of the 19<sup>th</sup> century, so that the ‘novel pattern’ of which Cannadine (1990, p. 347) writes was in some ways not so novel. I also show that there was a significant similar substitution of daughters of British businessmen for landed brides which was also driven by variations in agricultural estate incomes and which, although much less marked than with foreign brides, was prevalent during the whole of the 18<sup>th</sup> and 19<sup>th</sup> centuries, and increasing in intensity over time.

The strong tendency for the aristocracy to form the majority of exogamous unions (i.e. marriages outside of the aristocracy) with landed families suggests a form of positive assortative matching in the marriage market (Becker, 1973), with a high weight to prestige and lifestyle traits associated with landholding families, together with a system of lump-sum side payments,

i.e. dowries (Becker, 1991, pp. 126-129), where the lump-sum side payments or dowries can be bid up to clear the market, consistent with Stone's (1961) reference to dowries being determined by 'the simple factor of the laws of supply and demand'. During a period of agricultural decline, however, cash-constrained aristocratic potential grooms may seek higher lump-sum transfers and there may be cash constraints on the lump-sum transfer from landed families, allowing unlanded but nevertheless rich families to offer higher dowries in order to compensate for the lower level of prestige associated with non-landholders.

The remainder of the paper is set out as follows. The next section briefly discusses reasons why a number of newly rich American business magnates' families of the late 19<sup>th</sup> century were anxious for their daughters to marry into the British aristocracy, while in Section 3 I discuss the reasons behind the increased aristocratic demand for non-aristocratic brides during the same period and the link to the late 19<sup>th</sup> century British agricultural depression. Section 4 discusses the data, while Section 5 contains the main empirical analysis. A final section offers concluding remarks.

## **2. The Supply of wealthy American brides to the British aristocracy**

The societal and sociological reasons why a significant number of wealthy American families were anxious for their daughters to marry into the British aristocracy in the late 19<sup>th</sup> century has been studied extensively (e.g. Montgomery, 1989; Kehoe, 2004; De Courcy, 2017) and so needs little discussion. However, it is worth briefly highlighting three cases, which together illustrate the kinds of marriages and the amounts of money involved in this phenomenon.

The trend was arguably started by the marriage in 1874 of Jennie Jerome, the daughter of New York financier Leonard Jerome, and the younger son of the 7<sup>th</sup> Duke of Marlborough, Lord Randolph Churchill—a union which produced Winston Churchill. Leonard settled a dowry of £50,000 on the marriage (De Courcy, 2004, pp. 58-59), or some \$270,000 at the 1874 exchange rate, equivalent to around \$6.5 million in 2021 prices, although Randolph was only a younger son with a non-hereditary courtesy title.

Two years later, in 1876, Consuelo Yznaga, the daughter of Antonio Yznaga, a businessman who had made his fortune in West Indian sugar plantations before relocating to Newport, Rhode Island, married the heir to the Duke of Manchester, thereby proving that the

very highest social rank below royalty was not beyond the scope of the daughter of an American business family. However, the dowry settlement was significantly higher, at £200,000 or around \$1 million in 1876, equivalent to some \$26 million in 2021 prices (De Courcy, 2017, pp. 60-61).

Perhaps the most celebrated (or notorious) American-aristocratic marriage of the period, however, took place at the height of the trend in 1895, when the family of the American railroad magnate William K. Vanderbilt became allied to one of the most prestigious British aristocratic families when his daughter, Consuelo, married the 9<sup>th</sup> Duke of Marlborough. The dowry settlement was \$2.5 million (De Courcy, 2017, pp. 136-137), or around \$82 million in 2021 prices—which was much needed to restore the family fortunes and to restore and maintain the literally palatial Marlborough ancestral seat of Blenheim Palace in Oxfordshire.

But the Vanderbilts, the Jeromes and the Yznagas had all been excluded from the high society of New York and Newport, as had other similarly newly rich New York families (and their counterparts in Philadelphia or Boston; Montgomery, 1989; De Courcy, 2017). In the post-bellum period, East Coast high society was the jealously guarded preserve of families who could trace their ancestry back to the earliest Dutch or English settlers, and who socially ostracized the nouveau riche business magnates and their families. Therefore, a number of the newly rich businessmen such as Vanderbilt, Jerome and Yznaga (and more particularly the family matriarchs such as Alva Vanderbilt, Clara Jerome and Ellen Yznaga) turned their sights on marrying their daughters into the European, and particularly the British nobility as a means of establishing social pedigree—whatever the cost.

The trend largely ended with the outbreak of war in 1914 and the subsequent shifts in postwar American society in the 1920s.

### **3. The aristocratic demand for non-aristocratic and non-landed brides**

At the end of the 19<sup>th</sup> century, the British aristocracy was a small and powerful landed ruling elite: ‘In 1873, there were 363 owners of 10,000 acres in England, of whom exactly one-half were peers. But of those who owned 30,000 acres, three-quarters were members of the House of Lords’ (Cannadine, 1990, p.17). It is in some ways odd that Britain, the birthplace and cradle of the Industrial Revolution, should have had an hereditary ruling class with a birth right to sit in the second chamber of the British parliament, but whose position was economically and socially dependent on land and agriculture. In part, of course, this was a historical legacy in that



the aristocracy, with its feudal origins, predated the Industrial Revolution. However, the chief priority of an unelected ruling elite is to hold on to power, influence and prestige and, to do this, entry into the class must be strictly limited. In part, this can be done by prescribing manners and social behavior that are hard to acquire or imitate perfectly without being born into the class. If an element of this social behavior revolves around a style of living centered largely on a country estate, then land ownership itself becomes an entry requirement, which is exclusive because, especially in a geographically small country like Britain, land is scarce. A feature of the British aristocracy, however, was that it did allow entry in terms of the offspring of non-aristocratic families marrying into the aristocracy, but usually only after the acquisition of an estate with an income that removed the ‘taint of trade’ and provided a life style parallel to that of the aristocracy. As Stone (1967, p. 39) asserts, ‘the measure of the resilience of a class structure is its ability to absorb new families of different social origin and convert them to the values and ways of life of the social group into which they are projected.’ Thus, elevation to the peerage or marriage into the aristocracy, while it was certainly an elevation in social rank, was mainly a recognition of a family’s ‘coming of age’ in terms of three intertwining factors, namely: the age of its money, its landowning status and its social behavior.<sup>4</sup> Historically, therefore, the traditional process for entering the British aristocracy was to acquire and live off the income from a landed estate so that one’s children or grandchildren would eventually be accepted as marriage partners by the aristocracy.

As noted above, this suggests a form of positive assortative matching in the aristocratic marriage market along the lines originally suggested by Gale and Shapley (1962) and extended by Becker (1973, 1991), with a high weight attached to prestige and lifestyle traits associated with landholding families, together with a system of lump-sum side payments, i.e. dowries (Becker, 1991, pp. 126-129).<sup>5</sup> In Becker’s (1991) analysis of dowries (or their converse, bride-prices), he shows that lump-sum transfers will be bid up until a market-clearing equilibrium is achieved (Becker, 1991, p. 128). But during a period of agricultural decline aristocratic bridegrooms may require higher transfers at the same time as cash-constraints are binding on

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<sup>4</sup> In terms of direct elevation to the peerage through the granting of new hereditary lordships to men by order of the sovereign, this was almost exclusively reserved for those who already possessed significant landed estates. Cannadine (1990, p. 17), for example, notes that ‘between 1832 and 1883, only nine new landless peers were created’.

<sup>5</sup> See Goñi (2020) for an application of positive assortative matching to the aristocratic marriage market.

lump-sum transfers from landed families, allowing unlanded but nevertheless rich families to offer higher lump-sum transfers in order to compensate for the lower level of prestige associated with non-landholders.

The British agricultural depression is usually dated from the early 1870s until the end of the century (Fletcher, 1973; Thompson, 1963), and was largely caused by the fall in grain prices that followed the opening up of the American prairies to cultivation in the 1870s, the late 19<sup>th</sup> century expansion of the American railway transport system, the advent of inexpensive international transportation with the rise of steamships, and other advances in agricultural technology (Conacher, 1973; Fletcher, 1973). For these reasons, the British Corn Laws having been repealed in 1846, cheap imports of vast amounts of American prairie wheat were able to flood the market and undercut and overwhelm British wheat farmers, a large proportion of whom were tenant farmers on landed estates. ‘The effects were to be seen in mounting arrears of rent, bankrupt and ruined tenants, and falling rent rolls’ (Thompson, 1963, pp. 308-309).<sup>6</sup>

It was during exactly this period that there was an influx of American heiresses into the British aristocracy.

#### **4. Data**

My main source of data on marriages of the aristocracy is Thomas (1972). Hollingsworth’s (1964) monograph was the first major study of the demography of the British peerage, but the analysis of the social class or country of origin of spouses was not a major objective of Hollingsworth’s study, and his data does not allow a fuller picture of the marriage partners of peers and their children. The present analysis therefore draws mainly on Thomas (1972), which reports data collected from primary sources on the first marriages of 3,038 male peers and their legitimate sons born between 1690 and 1899. The peerages are those created before 1800, not extinct before 1900, and which are listed under the rank of their pre-1800 creation in the 1925 edition of *Burke’s Peerage, Baronetage and Knightage*. The analysis is largely confined to peerages of some antiquity and longevity in order to avoid any bias which might have been introduced by the inclusion of peerages which became extinct within a generation or so of their creation. The total number of aristocratic families studied is 315 (at

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<sup>6</sup> Thompson points out that the fortunes of arable and livestock farmers diverged somewhat, although rents on most estates fell during this period, regardless of farming specialization (Thompson, 1963, pp. 310-311).

1800) made up of 22 dukedoms, 14 marquessates, 127 earldoms, 32 viscountcies and 120 baronies. Thomas obtained detailed information on the rank, occupation and nationality of brides' fathers from a manual search of the marriage certificates lodged at Somerset House in London and at the Office of the Registrar General at Edinburgh, and recorded details of 2,178 aristocratic marriages. An issue with the Thomas data, however, is that he reports only cohort-level data for ten 20-year cohorts born between 1700 and 1899. Nevertheless, the data cover a span of over 2,000 aristocratic marriages over two centuries, and a breadth of over 300 aristocratic families, and some striking inferences may still be drawn; it is hoped that this paper will elicit further data gathering and analysis of this issue.<sup>7</sup>

I also use data on London wheat prices from Clark (2004) for 1700-1769 and the revised series for 1770-1914 from Solar and Klovand (2011), as well as a historical series on the British retail price index from Clark (2021).

## 5. Empirical analysis

Consider Table 1, which shows data on marriages by the British aristocracy for cohorts of aristocratic males born in 20-year periods during the 18<sup>th</sup> and 19<sup>th</sup> centuries to women from other aristocratic families (endogamous, or in-marriages) and to women from outside of the aristocracy (exogamous, or out-marriages), both for heirs to the aristocratic title and for younger sons of hereditary lords. Hollingsworth (1964), examining similar data, notes the remarkable stability of the mean age at which aristocratic males married, namely 32 during the 18<sup>th</sup> century and around 33 during the 19<sup>th</sup> century.<sup>8</sup> Hence, we can infer that the likely period of marriage of each cohort is some 33 years later (so that, e.g., the cohort born 1840-1859 was likely married in the period 1873-1892).

[TABLE 1 ABOUT HERE]

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<sup>7</sup> The Hollingsworth (1964) peerage database has recently been fully digitized from the original records by the Cambridge Group for the History of Population and Social Structure at Cambridge University (Reid and Newton, 2021).

<sup>8</sup> Of the four 19<sup>th</sup> century aristocratic cohorts examined by Hollingsworth, that for 1850-1874 has a mean age at marriage of 34 while the other three are 33; see Hollingsworth (1964, p. 11, Table 2).

The first point to note from Table 1 is that endogamous marriages were less than 50 percent of aristocratic male marriages overall during both the 18<sup>th</sup> and 19<sup>th</sup> centuries, although the percentage was roughly double for heirs compared to younger sons for all cohorts. In terms of the present analysis, however, the more interesting point is that there were indeed declines in the percentage of in-marriages in the late 19<sup>th</sup> century during the agricultural depression: for both heirs and younger sons, the proportion of endogamous marriages reaches its lowest level in the last two or three 19<sup>th</sup> century cohorts.

Table 2 breaks down the data on exogamous marriages (i.e. the final column of Table 1) into marriages to the daughters of knights, baronets, untitled British commoners and foreigners. While Thomas (1972) records details of aristocratic exogamous marriages to foreign—i.e. non-British—brides, he does not provide a further breakdown by nationality. However, his count of aristocratic out-marriages to foreigners for the cohorts born 1840-1859 and 1860-1879 is 42+51=93 (Table 1), covering a likely marriage period spanning 1873-1912. Given Montgomery's count of 100 aristocratic out-marriages to American women over the period 1870-1914 (Montgomery, 1989, Appendix A), this implies that Thomas's count of foreign brides is a close proxy for the count of American brides marrying into the aristocracy in the decades before World War I.

[TABLE 2 ABOUT HERE]

A striking feature of Table 2 is the dramatic increase in the percentage of exogamous marriages to foreigners during the last three 19<sup>th</sup>-century cohorts, which more than doubles (reaching 14.4%) for the 1840-1859 cohort (marriages around 1873-1892) and reaches a peak of one-fifth of exogamous marriages for the 1860-1879 cohort (marriages around 1893-1902). A central element of our thesis is that the late 19<sup>th</sup> century agricultural depression, beginning in the early 1870s, reduced the financial attractiveness of the traditional source of exogamous brides for the British aristocracy, namely daughters from untitled landed families. The coincidence of the decline in the percentage of exogamous marriages to British commoners (down to 66.7% from 74.8%) and the strong uptick in marriages to foreigners (up to 20.2% from 14.4%) for the cohort born 1860-1879, shown in Table 2, suggests that this may be the case.

Table 3 shows the data broken down further, according to: the profession of the father of the exogamous commoner bride, whether the bride's family was landed, and whether the bride was foreign.

[TABLE 3 ABOUT HERE]

This table illustrates quantitatively a central element of our argument, namely that the standard way for a family to gain admission to the aristocracy was to become landed: for the whole of the 18<sup>th</sup> century and until the 19<sup>th</sup> century agricultural depression (i.e. the cohort born 1840-1859, married around 1873-1892), marriage alliances with untitled landed families comprised 40 percent or more of exogamous marriages to commoners, and was the largest source of commoner brides to the aristocracy in all periods. Marriages to daughters of clergymen or military officers compose the next highest proportion of exogamous marriages to British commoners during most of the 20-year periods prior to the agricultural depression. This is not surprising, however, given that the military and the church were the career paths of most younger sons of aristocratic families. Indeed, unions with daughters from landed, military and church families together account for some two thirds or more of aristocratic out-marriages before the agricultural depression. In contrast, exogamous marriages to daughters of men classed as being in business never breaks double figures as a percentage of the whole during either century: wealth 'tainted by trade' needed purification through the possession of land before it became acceptable in the very highest social circles. Presumably because of the wealth attached to business families however, the proportion of exogamous business brides nevertheless dominates exogamous marriages to daughters of men engaged in other upper-middle class professions such as law and medicine.<sup>9</sup> Coincident with the late 19<sup>th</sup> century decline in the percentage of exogamous landed marriages, it is noticeable that the percentage of out-marriages to foreigners rises, doubling as a percentage of the whole of the untitled or foreign marriages, to over 16 percent for the 1840-1859 cohort and increasing again to around a quarter of all exogamous marriages for the following cohort.

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<sup>9</sup> The category of professions labelled 'Academic, art and science' in Table 3 'comprises academics, fellows and graduates of colleges; professors; authors; editors; writers; antiquaries; artists; painters; architects; actors and musicians' (Thomas, 1972, p.111). Clearly, then as now, academia was occasionally a route to fame but seldom to fortune.

Some of these patterns are drawn out more clearly in Figure 1, which graphs the percentage of total aristocratic marriages that were endogamous (column 8 from Table 1) and the percentage of exogamous marriages to foreigners and British commoners that were accounted for by out-marriages to foreigners, to the daughters of landed commoner families, and to the daughters of men in business (i.e. the data as shown in columns 3, 4 and 6 of Table 3).

[FIGURE 1 ABOUT HERE]

Figure 1 also graphs the real London price of wheat (shillings per quarter bushel, deflated by a cost-of-living index with the first period as base), as a proxy for real agricultural prices in general,  $RWheat(+33)$ . I constructed this series as the 20-year average price of wheat in London, deflated by the retail price index for 20-year periods corresponding to the same birth cohort periods as before but 33 years later; thus, for example, the real wheat price observation for 1840-1859 is the average London real wheat price during the likely years of marriage of the cohort born 1840-1859, namely 1873-1892, given that the average age of marriage of male peers was uniformly around 33 years (Hollingsworth, 1964).

Figure 1 illustrates very clearly that the percentage of exogamous marriages to daughters from landed families, while always remaining the largest single group, is in decline for all aristocratic cohorts born after 1759, coterminous with the decline in average real wheat prices that begins after the Napoleonic wars and accelerates during the agricultural depression. It is indeed quite striking how closely movements in the percentage of landed brides follow movements in the real wheat price: the only two cohorts for which the movement in the landed bride percentage does not follow the movement in the real price of wheat are those whose likely marriage period overlaps with the period of the Napoleonic wars (1803-1815), namely the cohort born 1760-1779 (likely marriage period 1799-1802) and the cohort born 1780-1799 (likely marriage period 1813-1832). Further, movements up and down in the landed bride percentage appear to mirror opposite, if not equal, movements in the foreign bride percentage and in the percentage of exogamous marriages to businessmen's daughters. While the correlation in movements in the percentage of endogamous marriages with movements in the real price of

wheat is not as marked as it is for movements in exogamous landed marriages, the degree of co-movement does appear to be more marked for the later 19<sup>th</sup>-century cohorts.

### 5.1 Small-sample analysis with two centuries of data

As noted above, a frustrating aspect of the Thomas data is that he reports only cohort-level data for ten 20-year cohorts from 1700 to 1899, making statistical analysis, with data aggregated to ten periods, difficult. However, it is important to note that the data cover a span of 2,178 aristocratic marriages over two centuries and a breadth of 315 aristocratic families, and are aggregated over 20-year periods, so one would expect movements in these series to represent fundamental economic and social forces, with a low noise-to-signal ratio. I therefore attempted to apply inferential statistical techniques appropriate to such a scenario.

In Table 4, I show the sign of the change ( $\Delta$ ) in the series *Endogamous* ( $\Delta E_t$ ), *Foreigners* ( $\Delta F_t$ ), *Landed* ( $\Delta L_t$ ), *Business* ( $\Delta B_t$ ) and *RWheat(+33)* ( $\Delta RW_t$ ) from the previous 20-year period, i.e. whether the change from the previous period is positive or negative.

[TABLE 4 ABOUT HERE]

If declines in agricultural prices led, with probability greater than 0.5, to declines in the proportion of total aristocratic marriages that were endogamous, then there should be a tendency for changes in the endogamous proportion of total marriages,  $\Delta E_t$ , to be the same sign as changes in the real wheat price,  $\Delta RW_t$ . We have data on these signs for nine periods or ‘trials’. If the two series were in fact independent then, for any given sign of  $\Delta RW_t$ , the probability of this being matched by the sign of  $\Delta E_t$  is 50% or 0.5. In fact, we can see from Table 4 that this sign match occurs in 5 of the 9 periods. We can therefore refer this to the binomial probability distribution to calculate the probability of 5 successes occurring in 9 Bernoulli trials when the probability of success in each trial is 0.5, i.e.  $\binom{9}{5}0.5^9 = 0.246$ , or 25%, which by itself is not that impressive, although it is interesting to note that the five periods in which there is a sign match correspond to all five cohorts born in the 19<sup>th</sup> century.

Similarly, if a decline in agricultural prices led with probability greater than 0.5 to a decline in the proportion of exogamous marriages to landed brides, then changes in the landed

proportion,  $\Delta L_t$ , should tend to be the same sign as changes in the real wheat price,  $\Delta RW_t$ . As we can see from Table 4, this sign match occurs in 7 of the 9 periods. We can therefore refer this to the binomial probability distribution to calculate the probability of 7 successes occurring in 9 Bernoulli trials when the probability of success in each trial is 0.5, i.e.  $\binom{9}{7}0.5^9 = 0.0703$ . We can therefore reject at the 10% significance level the null hypothesis that these two series are statistically unrelated against the alternative hypothesis that they are related as I suggest. Further, examination of Table 4 shows that the two periods when the signs of  $\Delta L_t$  and  $\Delta RW_t$  do not match, namely the two likely marriage periods 1793-1812 and 1813-1832, correspond exactly to the two periods overlapping the Napoleonic wars (1803-1815), when both foreign relations and the price of wheat were subject to extraneous pressures.

If business brides were substituted for landed brides as agricultural prices declined, one would expect a tendency for  $\Delta B_t$  to be opposite in sign to  $\Delta RW_t$ . Remarkably, we can see from Table 4 that this sign pattern occurs in all nine periods over the two centuries, which has an overall probability of occurring purely randomly of  $0.5^9=0.002$ , so that we can easily reject at the 1% level the null hypothesis that these two series are unrelated against the alternative that they are related as I suggest.

Finally, consider the pattern of signs of changes in exogamous marriages to foreigners,  $\Delta F_t$ , and in the real wheat price,  $\Delta RW_t$ . If foreign brides were substituted for landed brides when agricultural prices declined, the signs of these changes should also tend to be opposites. This pattern occurs in 4 of the 9 periods, with binomial probability of  $\binom{9}{4}0.5^9 = 0.246$  under the null hypothesis that they are not related (4 successes in 9 trials with 0.5 probability of success), or around 25%, which again is less impressive when considered alone.

However, consider the number of periods when *all* signs for *all four* series are as predicted under our central hypothesis for any given sign of change in the real wheat price, i.e. in 4 of the 9 periods (the 4 cohorts born between 1800 and 1879). While this may seem quite a low proportion, the probability of all signs occurring as predicted when they are in fact unrelated and purely random is quite low. If the probability of any individual sign occurring is an independent 0.5, then for any given sign of  $\Delta R_t$  the probability of the signs of all four of the other changes falling in line as predicted is  $0.5^4 = 0.0625$  for each period. If we then consider all 9 periods (trials), from the binomial distribution, the probability of 4 successes in 9 Bernoulli trials in which the probability of success is 0.0625 is  $\binom{9}{4}(0.0625)^4(1 - 0.0625)^5 = 1.39 \times 10^{-3}$ . Thus,



when the full two centuries of data are considered, we can reject at the 1% level the joint null hypothesis that the signs are purely random against the alternative hypothesis that the series are related as I suggest. Note, moreover, that the four periods when this pattern holds exactly correspond to the four marriage periods sandwiched between the end of the influence of the Napoleonic wars and the beginning of World War I, i.e. 1833-1852, 1853-1872, 1873-1892 and 1893-1912, which overlaps with the late 19<sup>th</sup>-century agricultural depression.

Indeed, If we focus just on these four 19<sup>th</sup> century cohorts, all signs are exactly as predicted in all four periods (4 successes in 4 trials), which has a probability of occurring of  $0.0625^4=1.53 \times 10^{-5}$  under the null hypothesis that the signs of the changes are purely random whatever the sign of  $\Delta RW_t$ , and we can reject at the 1% level the joint null hypothesis that the signs are purely random against the alternative hypothesis that the series are related as I suggest during the 19<sup>th</sup> century.<sup>10</sup>

Overall, therefore, even though we only have data aggregated to ten cohorts over a two-century span, we are still able to make some statistical inferences which are strongly supportive of our central hypothesis.

## 6. Conclusion

In this paper, I have examined the phenomenon of the significant proportion of male aristocratic exogamous marriages that were to American heiresses during the four decades leading up to World War I. My central thesis is that the accelerated decline in British agricultural prices in the late nineteenth century, which reduced the income of aristocratic landed estates at the same time as it reduced the income of commoner landed families, led to richly dowried American brides being substituted for brides from the untitled British landed families—traditionally the chief source of women marrying into the aristocracy. I provided empirical data analysis that is supportive of this thesis. I also showed, however, that this was part of a wider—although less pronounced—phenomenon whereby foreign brides were substituted for British exogamous landed brides during much of the 19<sup>th</sup> century when agricultural prices declined. Further, there is significant evidence of substitution for landed brides with British business family brides for the whole of the 18<sup>th</sup> and 19<sup>th</sup> centuries, albeit at a lower rate than for foreign

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<sup>10</sup> Equivalently, this can be viewed as the probability of 16 successes (16 signs occurring as predicted over the 4 periods) in 16 Bernoulli trials with probability of success of 0.5, i.e.  $0.5^{16}=1.53 \times 10^{-5}$ .

brides. The results are consistent with a form of positive assortative matching in the marriage market, supplemented by a lump-sum transfer (dowry) to the bridegroom: during a period of agricultural decline there may be cash constraints on the lump-sum transfer from landed families, allowing unlanded but nevertheless rich families to offer higher lump-sum transfers in order to compensate for the lower level of prestige associated with non-landholders.

**Table 1: Endogamous and Exogamous Marriages of the British Peerage**

<i>Cohort born</i>	<i>Total married</i>	<b>Endogamous Marriages</b>						<b>Exogamous Marriages</b>		
		<i>Heirs</i>	<i>%</i>	<i>Younger sons</i>	<i>%</i>	<i>All</i>	<i>%</i>	<i>Heirs</i>	<i>Younger sons</i>	<i>All</i>
1700-19	200	33	47.1	28	21.5	61	39.5	37	102	139
1720-39	243	30	33.3	25	16.3	55	22.6	60	128	188
1740-59	221	39	44.8	26	19.4	65	29.4	48	108	156
1760-79	334	43	39.4	49	21.8	92	27.5	66	176	242
1780-99	306	47	45.2	38	18.8	85	27.8	57	164	221
1800-19	378	50	43.5	50	19.0	100	26.5	65	213	278
1820-39	346	42	40.8	59	24.3	101	29.2	61	184	245
1840-59	379	43	36.1	45	17.3	88	23.2	76	215	291
1860-79	318	28	26.7	38	17.8	66	20.8	77	175	252
1880-99	208	22	28.6	20	15.3	42	20.2	55	111	166

Data source: Thomas (1972) and author's calculations.

**Table 2: Exogamous Marriages of the British Peerage to Daughters of Foreigners, Knights, Baronets and British Commoners**

<i>Cohort born</i>	<i>Total exogamous marriages</i>	<i>Marriages to daughters of:</i>							
		<i>Foreigners</i>	<i>%</i>	<i>Knights</i>	<i>%</i>	<i>Baronets</i>	<i>%</i>	<i>British commoners</i>	<i>%</i>
1700-19	139	8	5.8	5	3.6	15	10.8	111	80.0
1720-39	188	13	6.9	6	3.2	25	13.3	144	76.7
1740-59	156	6	3.8	5	3.2	11	7.0	134	85.3
1760-79	242	19	7.9	2	0.8	20	8.3	201	83.0
1780-99	221	8	3.6	7	3.2	24	10.9	182	82.3
1800-19	278	27	9.7	17	6.1	27	9.7	207	74.5
1820-39	245	16	6.5	12	4.9	34	13.9	183	74.8
1840-59	291	42	14.4	10	3.4	21	7.2	218	74.8
1860-79	252	51	20.2	10	4.0	23	9.1	168	66.7
1880-99	166	25	15.1	8	4.8	7	4.2	126	76.0

Data source: Thomas (1972) and author's calculations. Column 2 ('Total exogamous marriages') matches the final column of Table 1.

**Table 3: Exogamous Marriages of the British Peerage to Daughters of Foreigners and British Commoners, broken down by Foreigners and Family Profession of British Commoners**

<i>Cohort born</i>	<i>Total to foreigners and British commoners</i>	<i>Marriages to daughters of:</i>									
		<i>Foreigners %</i>	<i>Landed %</i>	<i>Military %</i>	<i>Business %</i>	<i>Church %</i>	<i>Law %</i>	<i>Admin. %</i>	<i>Academic, art and science %</i>	<i>Medicine %</i>	<i>Misc. and unknown %</i>
1700-19	119	6.7	44.5	6.7	7.6	4.2	4.2	4.2	0.8	2.5	18.5
1720-39	157	8.3	52.2	7.0	6.4	5.7	1.3	0.0	1.3	0.6	17.2
1740-59	140	4.3	51.4	9.3	8.6	3.6	2.1	1.4	0.7	2.9	15.7
1760-79	220	8.6	43.2	10.9	3.6	11.4	1.4	0.9	1.4	0.5	18.2
1780-99	190	4.2	46.3	11.1	5.3	10.0	1.6	1.6	1.6	0.5	17.9
1800-19	234	11.5	39.7	14.5	5.6	9.0	2.1	2.1	0.9	0.4	14.0
1820-39	199	8.0	41.2	18.1	1.5	10.1	2.5	3.5	2.0	1.0	12.1
1840-59	260	16.2	33.8	15.8	4.2	11.2	3.1	3.5	1.9	0.8	9.6
1860-79	219	23.3	29.2	19.2	6.8	4.1	4.6	0.9	0.0	0.9	11.0
1880-99	151	16.6	24.5	22.5	8.6	2.0	4.0	2.0	5.3	1.3	13.2

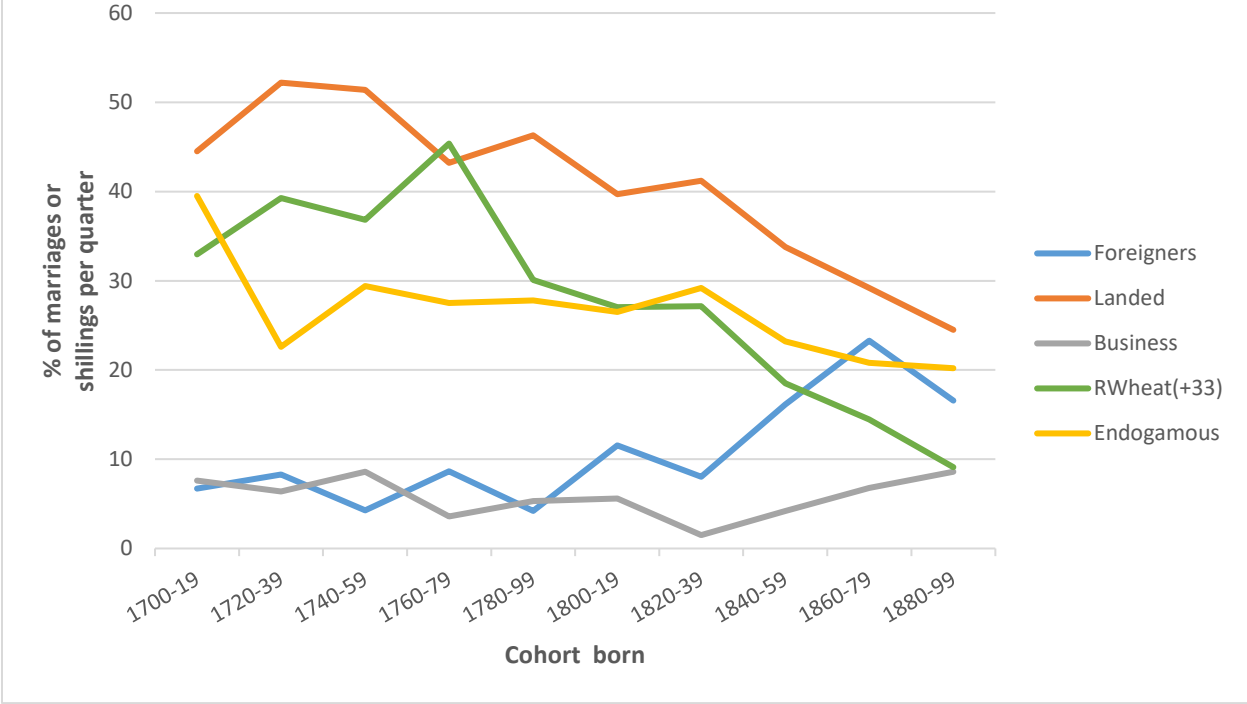
Data source: Thomas (1972) and author's calculations. Column 2 ('Total to foreigners and British commoners') is the sum of column 3 ('Foreigners') and column 9 ('British commoners') in Table 2.

**Table 4: Qualitative Changes in the Percentage of Endogamous Marriages and in the Proportions of Exogamous Marriages to Daughters of Foreigners and of British Landed and Business Families, and in the Real Price of Wheat**

Cohort born	$\Delta B_t$	$\Delta F_t$	$\Delta L_t$	$\Delta E_t$	$\Delta RW_t$	Likely marriage period
1720-1739	-	+	+	-	+	1753-1772
1740-1759	+	-	-	+	-	1773-1792
1760-1779	-	+	-	-	+	1793-1812
1780-1799	+	-	+	+	-	1813-1832
1800-1819	+	+	-	-	-	1833-1852
1820-1839	-	-	+	+	+	1853-1872
1840-1859	+	+	-	-	-	1873-1892
1860-1879	+	+	-	-	-	1893-1912
1880-1899	+	-	-	-	-	1913-1932
<i>#sign as predicted</i> 1720-1899	9 [0.002]	4 [0.246]	7 [0.0703]	5 [0.246]		
<i>#all signs as predicted</i> 1720-1899					4 [1.39x10 <sup>-3</sup> ]	
<i>#sign as predicted</i> 1800-1879	4 [0.0625]	4 [0.0625]	4 [0.0625]	4 [0.0625]		
<i>#all signs as predicted</i> 1800-1879					4 [1.53x10 <sup>-5</sup> ]	

Note: The table shows the sign of the change ( $\Delta$ ) in the series *Endogamous* ( $\Delta E_t$ ), *Foreigners* ( $\Delta F_t$ ), *Landed* ( $\Delta L_t$ ), *Business* ( $\Delta B_t$ ) and *RWheat(+33)* ( $\Delta RW_t$ ) from the previous period. ‘*#sign as predicted*’ denotes the total count of cases when the sign of the change is opposite to the sign of  $\Delta R_t$  (for  $\Delta B_t$  and  $\Delta F_t$ ) or the count of cases where the sign matches the sign of  $\Delta R_t$  (for  $\Delta E_t$  and  $\Delta L_t$ ), for the periods indicated. ‘*#all signs as predicted*’ denotes the total count of cases when the sign of all changes are as predicted, given the sign of  $\Delta R_t$ . Figures in square brackets denote the probability of the various counts occurring, referred to the appropriate binomial probability distribution under the null hypothesis that the sign of any change in endogamous or exogamous marriage proportion in the table occurs independently with probability 0.5.

**Figure 1: Endogamous Marriages of the British Peerage and Exogamous Marriages to Daughters of Foreigners and of British Landed and Business Families, and the Real Price of Wheat**



Note: The graph depicts series for the percentage of endogamous marriages as a proportion of total aristocratic male marriages (column 8 of Table 1) and the proportions of exogamous marriages to daughters of foreigners and of British landed and business families (columns 3, 4 and 6 Table 3) as well as the series *RWheat(+33)*, which is the average real price of wheat in London (shillings per quarter; deflated by the retail price index) for 20-year periods corresponding to the birth cohort periods but 33 years later. Sources for the wheat price data are Clark (2004) for 1700-1769 and Solar and Klovand (2011) for 1770-1914, spliced at 1770; the source for the RPI data used to deflate the wheat price series is Clark (2021).

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