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Household predictors of the number of life-cycle servants in Orkney, Scotland, 1851-1901

Julia A. Jennings
Department of Anthropology, Population Research Institute
Pennsylvania State University, University Park, PA 16802

On the 16th October in the year 58,
I went to the ploo, nae doots to haud straucht,
Mysel' in good humour, my horses the same,
I ploo'd till eleiven, and then I cam' hame,
Gaed Nell and Nansy some corn to eat,
An' syne took a besom and swypet my feet.
Then to the barn I quickly withdrew,
To bundle some straw, but, oh, what a stew!
When denner was over to the stable we went,
To clean up oor horses it was oor intent.
Oor order fae Dawson for plooin, again,
Nae sinsheen, but cloody and some draps o' rain.
Noo my day's wark is finisht, and I'll hae a smoke,
An' I'm boun for my bed, for it's past nine o'clock.
(Buchan 1984:238)[1]

Introduction

The significance of the presence of servants in Northwest European households was first recognized by historical demographers in their description of what has come to be known as the "European Marriage Pattern" (Hajnal 1965; Laslett 1977). In his influential paper on rules of household formation, Hajnal (1982) indentified as a characteristic of this region in the 17th-19th centuries the frequent circulation of young people as household servants. He described the general nature of the institution of service as follows:

> (1) Servants were numerous, apparently always constituting at least 6 per cent, and usually over 10 per cent, of the total population. (2) Almost all servants were unmarried and most of them were young (usually between 10 and 30 years of age. (3) A substantial proportion of young people of both sexes were servants at some

[1] Poem written in 1858 on the wall of a chaumer in Aberdeenshire. A chaumer is a structure attached to the main farming buildings and is often a loft. It customarily houses agricultural servants, but unlike a bothy, a separate structure to house unmarried male farm laborers, it is not an outbuilding. Fae=from, ploo=plow, besom=broom, corn=grain (probably oats). Nell and Nansy are the horses and Dawson is presumably the landowner or foreman/factor.

> stage in their lives. (4) Most servants were not primarily engaged in domestic tasks, but were part of the work force of their master's farm or craft enterprise. (5) Servants lived as members of their master's household. (6) Most servants were members of their master's household by contract for a limited period. (7) There was no assumption that a servant, as a result of being in service, would necessarily be socially inferior to his or her master. The great majority of servants eventually married and ceased being servants. Their social class before service (i.e., usually the class of their parents) and their social class after service could be the same as their master's (and in some Northwest European populations at some periods this was not infrequently the case). (Hajnal 1982:473)

Laslett termed these young laborers "life-cycle servants" in acknowledgement of the status of these individuals as temporary servants, rather than as members of a servant class (1977:34). Indeed, it is essential to think of these servants in life-cycle terms, as their status was not permanent, and although service provided useful training in agricultural tasks, it was not a career (Goldberg 1992; Whittle 2000).

Life-cycle service is commonly linked to the system of household formation that features late age at marriage, high rates of celibacy, and the predominance of nuclear households, but research outside of Northwest Europe, particularly in Italy, has provided examples of both nuclear household systems that do not feature life-cycle servants, and multiple (or complex) household systems that do (Arru 1990; Kertzer 1984; Kertzer and Barbagli 2002; Kertzer and Hogan 1990; Landsteiner 1999; Molin 1990). Life-cycle service has also been documented in Japan, far east of the "Hajnal line" that is said to define the spatial extent of the Northwest European marriage pattern (Nagata 2005). For the purposes of this study, the description and discussion of the institution of life-cycle service will be restricted to how it was practiced in Northwest Europe, particularly in the British Isles.

This study examines household predictors of the number of life-cycle servants present within households. It also compares predictors of the number of male and female servants. Multiple regression methods are used to assist in the identification of factors that influence the

number and sex of servants present in the household, after controlling for various household characteristics, including those related to the household head.

Servants are often viewed as a supplement to household labor employed to ensure sufficient food and craft production and full use of the household's resources, such as land and livestock. Therefore, all other things being equal, it is hypothesized that the amount and quality of land to which a household has access, the size and composition of the household labor force, and the overall consumption requirements of the household will be important predictors of the number of servants a household hires. In addition, male and female labor may be deployed differently, depending on the specific tasks a household must accomplish. Thus, the sex of the servant hired might be predicted by household factors, including access to land, household age and sex composition, and household size, while controlling for other factors.

Data from Orkney, off the northern coast of mainland Scotland, provide an opportunity to contribute to the study of life-cycle service, an important part of life in Europe in the preindustrial past. Service occupied many young people, moved people about the landscape, and was often an important component of the household economy of traditional farmers. Service in Orkney persisted throughout the study period (1851-1901) and available historical sources provide information about individuals, households, and landholdings, making this dataset useful for the examination of how household composition and land resources affected the hiring of servants.

Background

Setting & Data Sources

The Orkney Islands lie off the north coast of Scotland where the North Sea and Atlantic Ocean meet. Six islands, Westray, Sanday, Papa Westray, Eday, Faray, and North Ronaldsay,

are included in the study area. These islands are the focus of an ongoing multidisciplinary study of population, family history, settlement, and land use known as the North Orkney Population History Project (Murtha et al. 2008; Sparks 2007). The islands are still rural in character and during the period of interest (1851-1901) featured mixed agricultural production based on grains, mainly black oats and bere (a landrace of barley), root crops, such as potatoes and turnips, and livestock, including cattle, sheep, chickens, and pigs. In the study period, these activities supported household subsistence and paid rents. Individual farmsteads, or groupings of household and agricultural structures with associated gardens and fields, were the primary locus of agricultural production, and were dispersed over the islands, with a few small villages that were more densely settled but still rural in character. The farmsteads all have names, and these names appear in historical records and persist for many generations, even though the inhabitants change over time (Palsson and Edwards 1981; Thomson 2008a, 2008b). Estate maps from the 1830's and 1840's feature farmsteads with the same names and locations as in later historical and modern maps. Orkney historians speculate that most of the farm names became fixed by the 1840's to accommodate record keeping, such as census enumerations and valuation rolls, and mail delivery (Thomson 2008a). The population of the islands reached its height in the mid- to late-1800s, after which out-migration, both to mainland Scotland and overseas, and declining fertility initiated the depopulation that continues to this day.

Farmstead names are listed in decennial census returns, along with the inhabitants of the farmstead and their relationship to the household head. This allows for the identification of servants, and the tracking of household size and composition over time. Valuation rolls, which are records of property values on which taxes were assessed, are linked to the census returns using farmstead names. These records are a good proxy measure of landholding size and quality.

This assessment is based on a sample of landholdings for which acres in pasture and arable could be obtained from surviving cadastral (estate) maps. In this sample, the amount of valuation, is almost entirely a reflection of the sizes of holdings (R^2=0.98).[2] The linked census and valuation records provide information about the household and household head. Many measures, such as valuation, household size, and age of the head, are taken directly from the historical records. Two theoretically important measures, household consumer-to-producer (C-P) ratio and household type, are the result of more elaborate calculation and classification and will be taken up in turn.

C-P Ratios

Traditional farming systems are characterized by human labor inputs, limited use or lack of fossil fuels (for tractors, for instance), limited use of wage laborers, and household organization of production (Netting 1993; Redfield 1989; Wolf 1966). Chayanov (1986) noted that the use of household labor distinguished smallholders from large-scale capitalist farming firms. In his theory of the peasant economy, the balance of workers relative to consumers was essential to understanding how families meet their needs while minimizing the drudgery of additional labor. Chayanov described how the relationship of household labor supply to consumption needs changes as the family develops. In his simple model, the consumer-producer (C-P) ratio is followed from the formation of a new household by a couple through their childbearing years (Table 1). As children are born, the C-P ratio becomes sharply unfavorable (Figure 1), placing economic pressure on the household that may be mediated by increased

[2] Specifically, a linear regression was used, with valuation as the outcome variable and the amount of arable and pasture (in acres) and the interaction of arable and pasture as predictor variables. The coefficients were highly significant and the fit was excellent. Other models combined data from different estates and islands and included main effect and interaction terms of lairds (landowners) to test whether lairds were translating acreage into valuation using different scales. None of the laird effects were significant. Therefore, it is concluded that valuations, which combine data from different estates, can be used as proxy measures of landholding size and quality without introducing bias.

intensity of production, decreased consumption, or the acquisition of additional labor, including the hiring of life-cycle servants. In his consideration of the changing nature of household workers and consumers, Chayanov applied a set of age- and sex-based weights to each household member, meant to represent their relative contributions to household production and their nutritional needs. Other studies, expanding on Chayanov's original scheme, have adopted their own sets of age- and sex-specific weights (Chibnik 1984; Hammel 2005; Hunt 1979; Lewis 1981). In this study, an updated set of weights proposed by Hammel in an elaboration of Chayanov's model is used (Table 2).[3] While the choice of weights may affect the result of statistical analyses, in a comparison of various measures of age- and sex-related weighting systems, the specific choice of weighting system have little effect on the coefficient of the C-P ratio variable when used as a predictor in simple regression models applied to data from this study area (Jennings and Wood 2009).

Regardless of the weighting system chosen, several studies find important effects of C-P ratios. Infant mortality is sensitive to increasing C-P ratios, so that families with unfavorable economic conditions are more likely to experience the death of an infant (Campbell and Lee 1996; Sparks 2007). These findings are corroborated by evidence that children's anthropometric measurements, such as height, weight, and body fat, are lower for their age in families with unfavorable C-P ratios (Hagen et al. 2006). Others have found that household land use allocation changes over the course of the family life cycle, a concept analogous to Chayanovian cycles in C-P ratios (Perz 2003). C-P ratios are also predictive of the formation and dissolution of extended-family living arrangements (Jennings et al. 2009a, 2009b). Given the importance of C-P ratios to various dimensions of the household economy and the demographic fortunes of

[3] Chayanov's original weights were substituted in the regression models described below, and the results did not substantively change.

households, it is hypothesized here that C-P ratios will also be an important predictor of the number and sex of household servants, who, as young adult household members, can have a considerable influence on the balance of household laborers relative to household consumption needs.

Household Types

Hajnal (1982) links life-cycle service to a household formation system in which nuclear (simple) households were the dominant form. Simple households consist of a married couple, or a surviving member of that couple, and their children.[4] Extended households, in contrast, feature one or more individuals additional to the simple household. In this study, extended households refer to both extended households and multiple households, which contain two or more married couples, as outlined in the classification system of Hammel and Laslett (1974). A third household type, not included in this classification system, is found in Orkney (Jennings et al. 2009a, 2009b). Using archaeological evidence, in tandem with written records, the North Orkney Population History Project has found that many units listed separately in the census were actually single economic entities. These "compound" households, often linked by brothers, are adjacent, or even structurally joined, and share a common set of farming structures such as barns, byres, grain kilns, and stables. Given what is known about Orcadian economic and social systems, the component units of compound households were probably not independent. Rather, they worked their landholdings cooperatively and shared the products of their labor, even if employed in outside wage labor, which was often part-time or seasonal. With respect to life-cycle servants, it is hypothesized that compound, and possibly extended, households were less

[4] These definitions refer to related individuals within the household. The presence of servants, as well as lodgers, boarders, and visitors, is not inconsistent with simple households as defined here. Thus, a household that contains a married couple, their children, a servant, and a lodger is classified as a simple household.

likely to hire servants, as their larger size and more complex kin organization might provide them with a larger and more diverse labor force, thereby decreasing the need for servant labor.

With these data sources and issues in mind, this paper examines the practice of life-cycle service in north Orkney in detail, paying particular attention to the characteristics of households that send members out as servants (source households) and the households that hire servants (sink households). The sexual division of agricultural labor and the different functions of male and female servants will also be considered.

Defining Servants

The precise definition of agricultural servants is complicated by the diverse, and often misleading, set of terms used to describe them. Even in her authoritative work on the subject of servants in husbandry, Kussmaul (1981b) describes servants as inherently ambiguous. Early descriptions of life-cycle servants shed some light on their defining characteristics. In his 1587 treatise on England, William Harrison, a contributor to Holinshed's Chronicles, an important source for Elizabethan social history, notes that English yeomen [smallholders] are "for the most part farmers to gentlemen or at the leastwise artificers; and with grazing, frequenting of markets, and keeping of servants (not idle servants as gentlemen do, but such as get both their own and part of their master's living) do come to great wealth…"(1968:117-118). This early observer makes a distinction between "idle" gentlemen's servants, such as butlers or grooms, and the working servants of agricultural households. In 1765, the great English jurist, William Blackstone (1979), defines four "species" of servant: domestic (life-cycle) servants, apprentices, day laborers, and factors/stewards. His description of the legal regulations regarding servants suggests their ubiquity and importance to the agricultural economy and rural life in general.

For this study, the definition developed by Kussmaul (1981a), who refers to life-cycle servants as servants in husbandry, is adopted. First, life-cycle servants are productive, hired to maintain the household economy, rather than maintain a lifestyle. Indeed, it has been suggested that much of the social movement of servants was lateral, instead of upward, meaning that servants worked in households similar to their own, rather than strictly for the well-to-do (Cooper 2004; Hajnal 1982; Laslett 1977). Life-cycle servants were found predominantly in rural districts and were not formal apprentices, whose parents usually paid the masters for several years of training. Generally, life-cycle servants had annual contacts, initiated during a hiring season at Martinmas [November 11] or Whitsunday [in Scotland, May 15] (Hasbach 1908; Kitchen 1981; Watson 1894). A contemporary account of the Martinmas or Whitsuntide hiring fair, and servants in general, is given in Appendix A.

Life-cycle servants were provided room and board as well as a wage. Given the small dwellings of most families during the period, this meant that life-cycle servants usually lived as part of their master's family and ate from the master's table (Kussmaul 1981a). Often, servants would change farms frequently, usually after a stay of only one or two years, unless both the master and servant found the situation unusually pleasant and productive (Devine 1984a; Kussmaul 1981b; Laslett 1977). Wages varied by age and sex, with lads earning the least, and women usually earning about half as much as men (Devine 1984b; Whittle 2005). Unlike day laborers, who were hired for a day, week, or specific task, the labor of life-cycle servants was continuously available to the farmer.

The status of the life-cycle servant was ambiguous; they might not be closely related, yet they lived as part of their master's family and were often described in familial terms (Hasbach

1908; Kussmaul 1981b).[5] They were also wage earners, who were saving for marriage or sending remittances to their families. This particular function of life-cycle service is a major tenet of the "Hajnal hypothesis" (Engelen and Wolf 2005). It proposes that, in Northwest Europe, there existed a normative requirement that a couple establish an independent household upon marriage. In order to do so, young people must inherit or earn, often through life-cycle service, sufficient resources to set up a household of their own. Hajnal (1982) suggests that late age at marriage together with the requirement for newly married couples to set up their own separate households kept rural populations in balance with their productive resources, such as land. However, the extent and direction of causation, if any, among late age at marriage, life-cycle service, and neolocal post-marital residence remains unclear.

Room and board, provided to servants in addition to their wages, largely sheltered them from the variations in prices in the housing and food markets that plagued landless, or nearly landless, day laborers (Whittle 2000, 2005). Appendix B outlines the life history of Fred Kitchen, who for parts of his life worked as an agricultural servant. His account speaks to several important characteristics and functions of life-cycle service, including frequent switching of farms, saving for marriage, and vulnerability to economic and demographic fortunes. It also features comparisons of life-cycle service to day labor and work in industry.

Life-cycle servants were found throughout preindustrial Western Europe, although their prevalence in the population varies regionally. In some areas of England, servants made up about 25% of the total population, but more commonly, only 10% of the total population consisted of servants at any one time (Kussmaul 1981a; Laslett 1977, 2000). Servants were generally rare in Italy and Spain, comprising at times only 1% to 3% of the total population

[5] However, it may be the case that servants often had kin ties to their masters. Future study using the Orkney data may be able to address the closeness and frequency of kin relationships in service arrangements.

(Laslett 1977; Reher 1998; Viazzo et al. 2005). In 19th century Lancashire, 28% of rural households had servants, whereas almost half of the English farming households in the Cambridge Group sample included servants (Anderson 1971; Kussmaul 1981a). In towns, the percentage of servants, many of whom were presumably not "productive" servants, varied widely, but this probably reflected differences in the concentration of wealth among the urban samples (Goldberg 1992). Laslett (1977) and Anderson (1971) both estimate that over half, and perhaps up to two-thirds of young, unmarried people could expect to go into service in England. Given the ubiquity of servants throughout Western Europe, and particularly in the British Isles, it is unsurprising that many assert that this mass movement of young people as servants is one of the major differences between the world of preindustrial Britain and our own (Kussmaul 1981a; Laslett 1977, 2000).

A Brief History of Service in England and Scotland

The origin of life-cycle service as an institution is cloudy. Evidence from English tax records indicate that about 20% of households in 1377 had servants (Smith 1984). Some scholars speculate that the labor shortage created by the Black Death provided an incentive to manage agricultural labor in this fashion (Hasbach 1908). Others cite the earlier (13th and 14th century) decline of serfdom as the motivating factor, as it allowed newly-freed smallholders to manage their own household economies (Whittle 2000).

Whatever its origins, once it was established, the practice of life-cycle service proved to have remarkable staying power, remaining largely unchanged for hundreds of years (Kussmaul 1981a). Change finally came to the system in Southern England in the late 18th century, and gradually spread northward. A series of social and economic trends probably contributed to the end of service. The rising price of grain made payments in board and in kind more costly, and,

by extension, payments in cash more economical (Hasbach 1908). Increases in population and decreases in mortality lessened the labor shortage, as farmers had more kin to call upon for labor (Wall 1986).[6] The age at marriage was declining, in part because real wages were rising and people had the resources to marry earlier (Cooper 2005). Agricultural improvements of the late 18th and early 19th century increased farm size and improved efficiency while decreasing the amount of labor needed to manage a farm (Devine 1984a). Near cities, the growth of industry competed for the labor of young men and women (Smout 1986). These factors contributed to the rising ratio of day laborers relative to life-cycle servants (Kussmaul 1981a). As Kussmaul puts it, "service had been nurtured by an agrarian environment of small farms, labour shortage, and a high age at marriage; it had been enmeshed in a web of social and economic relations. When the environment changed, servants ceased being hired" (1981a:133).

However, the decline of service did not occur uniformly throughout the British Isles. The institution survived longer in the north of England, and especially in Scotland, where the system did not fully erode until the 1940's (Ewan 2004; Gray 1984). While these two regions differ in the timing of the decline of service, comparative studies indicate that the practice of life-cycle service did not differ substantially between England and Scotland (Whyte 1989; Whyte and Whyte 1988). If this is true, then why did life-cycle service persist in Scotland? Several social and economic factors may have contributed to this pattern.

Some attribute the Scottish delay to conservative or old-fashioned practices (Hasbach 1908). However, Scottish farmers did adopt agricultural improvements, such as improved plows and the elimination of sub-tenants and cottars (Devine 1984a). We might look instead to certain Scottish agricultural practices, necessitated by climate, which differed from those in England,

[6] Wall, however, does not explicitly consider the role of declining fertility, which may have also affected the amount of kin labor available.

particularly southern England. In England, agricultural improvements led to the creation of very large arable holdings. When the demand for wheat rose, farmers responded by planting more of it. Wheat cultivation required intense, seasonal bursts of labor (Devine 1984a). This restructuring of the agricultural sector meant that day laborers fit farmers' needs better than servants (Cooper 2005). Scottish agriculture, in contrast, was characterized by mixed farming (both arable and grazing), and different staple grains, namely oats and bere instead of wheat (Fenton 1997; Shaw 1980). Pastoral and mixed agriculture was more conducive to live-in servants, as there was a steady demand for labor year-round (Whittle 2000). The traditional 5-course rotation of Scottish agriculture and the importance of root crops, such as potatoes and turnips that require singling, hoeing, and so on, also demanded year-round labor (Devine 1984a). In addition, the relatively small size of Scottish farms has been implicated in the persistence of life-cycle service. Scholars have noted that service remained longer in areas with smaller holdings and tended to disappear when those holdings consolidated (Gray 1984; Whyte and Whyte 1988). In areas where farms were larger in Scotland, farmers tended to replace servants who ate at the master's table with the bothy system, where the male servants lived separately from the master's family in a nearby out-building and cooked their own meals (Gray 1984).

Scotland and England also differed in their labor markets. Scotland's population did not grow as quickly as that of England, so a labor shortage in the region persisted longer (Devine 1984a). Limited transportation networks, especially in the Highlands and Islands, made payment in kind and the boarding of servants more efficient, as markets and villages could be a considerable distance away. A final contributor to the persistence of life-cycle service in Scotland was the poor law. In Scotland, unlike England, if someone was able-bodied and unemployed, they were not eligible for poor relief (Devine 1984a). This encouraged the practice

of life-cycle service, as it provided both shelter and employment in a region where the poor laws could not be depended on if day labor could not be obtained.

In light of these considerations, it is not surprising that life-cycle service remained an important feature of life in Orkney throughout the 19th Century. Servants were found in the households of both large landowners and small tenants. Relative to the mainland, Orkney had small, fragmented holdings, with a large number of tenants, rather than owner-occupiers (Shaw 1980). Mixed farming was practiced throughout the islands, providing comparatively even seasonal demands for labor. The islands also featured lower wages than did other regions of Scotland, providing yet another incentive to secure payment in kind (Levitt and Smout 1984).

Some functions of life-cycle service

Although life-cycle servants earned wages, their labor was a more like a substitute for household labor than that of day-laborers, as servants were provided room and board and lived and worked alongside household members (Whittle 2000). Indeed, it is possible to think of service as a solution to a variety of problems that faced the smallholder agrarian household economy. Life-cycle service provided a means for farming families to secure labor independently from their particular demographic fortunes. Smith noted that "service is indeed a remarkably efficient means of temporarily redistributing labour for maximum productivity" (1984:38). In this sense, service can be seen as a solution to the cyclical labor shortages created by changes in family composition, as described by Chayanov (1986), who in his original statement of the peasant economy, assumed that non-kin labor was unavailable or unobtainable. This is true for both source and sink families, as servants could be hired or young family members could be sent out in order to bring the family labor force into balance with the land and

other productive resources available to it. C-P ratios, therefore, are likely to be important predictors of the number of life-cycle servants present in a household.

Servants also provided a ready means to replace essential family members lost through death or illness, a loss that might have otherwise crippled the household economy. This insurance against loss also applied to the servants, who could be protected against orphanhood through active employment in service and the food and shelter it provided (Fauve-Chamoux and Wall 2005; Laslett 1988). By hiring live-in servants, employers gained control over the reliability of their labor force. They generally fed their servants well, but worked them hard. Servants were available 24 hours a day, should a crisis or other sudden demand arise, and they were kept under close supervision (Whittle 2005). Indeed, it has been hypothesized that this close supervision could have been a mechanism to check the unruliness of young laborers and maximize their productive potential by placing them under the scrutiny of employers, rather than parents (Stone 1979).

For young people, service had several attractive features. Although they were still under the authority of their masters, service allowed young people independence from their parents during the period between adolescence and marriage. As servants, they were able to accumulate some wealth and useful skills before they established families of their own. However, it has been debated whether it was in fact possible for servants to save enough to purchase a holding without contributions from an inheritance, or if they were still largely dependent on either inheritance alone or some combination of inheritance and earnings (Orr 1984; Watson 1894; Whittle 2005). Whittle (2005) estimates that in 16th century Sussex and Norfolk, the combined savings of a male and female servant over five years could purchase and furnish a cottage with a small holding (1 acre), while about 10 years of savings were needed to purchase a farmhouse

with a 10 acre holding. Although dependent on their masters, servants were largely immune to the direct effects of fluctuations in market prices and employment shortages that could ruin the prospects of a day laborer (Whittle 2000). Instead, market effects were probably passed on to them indirectly in terms of features such as food supply or demand or more intensive labor. In fact, it may have been that for many servants, leaving the occupation entailed a decrease in their standard of living, as they had to purchase food and lodging on the open market (Whittle 2005). Finally, servants' mobility allowed them to establish social networks beyond their kinship and local ties (Ewan 2004).

Wall (1986) argues that these features made service part of the "adaptive family economy." The institution of service provided flexibility to social, familial, and economic relationships and allowed households to diversify the employment of their members. Yet, while life-cycle service seems to be an elegant solution for families facing cyclical labor shortages and surpluses and young people delaying marriage, it is important to note that the institution of service had its drawbacks. Abuses occurred on the part of both master and servant, as evidenced in legal documents and complaints of the day (Blackstone 1979; Kussmaul 1981a; Whittle 2005). These include, but were certainly not limited to, disputes over wages and the quality of room and board, unreasonable labor demands, refusal or poor quality of work, theft, and leaving or terminating service without notice. The nature of the relationship between servants and their employers depended in large part upon the individual temperaments involved, and particular living and working conditions could range from very good to very bad. Informal and kin networks were probably important, not only for farmers finding servants, or servants finding positions, but also for inquiring into the character of the individuals involved (Goldberg 1992). Indeed, according to Kussmaul (1981a), many servants were found to be working for extended

kin, and parents and other kin often influenced hiring. In his autobiography, Fred Kitchen describes how he found work through the informal networks of fellow servants as well as farmers (Kitchen 1981).

Given their important role in the household economy, the number of servants present in a household could be influenced by the nature of the household labor force, as summarized by the C-P ratio, household size, the size of landholdings, and characteristics of the household head, such as employment in agriculture, age, sex, and marital status. Interactions of these variables, particular those related to the household labor force (C-P ratio and household size) and the size of landholdings, as measured by valuation, may prove important, as the literature on servants stresses the adaptive nature of service and its function of reshaping, or perhaps even optimizing, the household labor force relative to its productive resources.

Women in Service

The Orkney data not only provide information about the number of servants present in households, but the sex of the servant is also listed in the census records. In this sample population, male and female servants are found in roughly equal numbers. However, it is not clear whether male and female servants participated in the same productive tasks, or if servants were hired for sex-specific tasks. One might imagine that certain household characteristics, indeed many of the same characteristics described above, might be differentially associated with the numbers of male and female servants. Put another way, households with certain characteristics may be more likely to hire female servants, while other households may favor male servants, depending on their task-specific labor requirements. Previous studies of the sexual division of agricultural labor provide insight into the kinds of tasks that may have been preferentially performed by one sex over the other.

In rural districts throughout the British Isles, life-cycle service was the most common employment for single women (Pinchbeck 1969). Yet, there has been some debate about the extent of women's participation in agriculture (Whittle 2005). Some studies focus on their work as dairy maids and cooks, while others emphasize the range of tasks women performed. Contemporary sources, such as the Royal Commission on Labour, note:

> At many branches of farm labour, a good girl will do more than an average man, yet she had to be content with half his wages. No doubt women's wages have doubled within the last 40 years, but the fact remains that often when working side by side with the orra men and hinds she is doing as much as a man, and yet only getting half a man's wages.[7]

Differences between the sexes in the timing of leaving home (often for service) or in the division of labor have been observed in some studies. In a model of leaving the parental home, Dribe (2000) finds that the effects of other variables on leaving home differ between the sexes, although the overall pattern is similar. Many agricultural tasks were considered either sex-specific or were dominated by one sex. During the harvest, women were frequently hired as day laborers, and worked alongside both male and female life-cycle servants. Harvesting using the sickle, a semi-circular blade attached to a short handle, was acceptable for both sexes, but harvesting using the scythe, a long blade attached to a long handle, was solely the domain of men (Fenton 1976; Howatson 1984). Indeed, the development and adoption of heavier tools, such as the scythe, are said to be reflected in changes in the sexual division of labor (Snell 1985).

Examples of tasks commonly described as women's work included dairying, poultry keeping, vegetable growing, brewing, baking, weeding, and harvesting (Whittle 2000). In the context of Scottish agriculture, the digging of potatoes and turnips was a common female task (Pinchbeck 1969). Despite these gendered activities, or the purported sexual division of labor, many studies note that female servants participated in a full range of farm work, both "in and

[7] Royal Commission on Labour, 1893, p. 117, quoted from Devine 1984b, p. 119.

out" of the house (Gray 1984). This meant that women took part in heavy work as well as indoor duties. Others emphasize that women took part in every farm task, except the tending of horses (Devine 1984b). This included the heaviest kinds of agricultural labor: plowing and harrowing (Pinchbeck 1969). Yet, certain tasks, especially pulling turnips, dairying, and byre work, were dominated by women (Devine 1984b). Turnips were thought to be particularly demanding of women's labor (Devine 1984b).

Was the labor of male and female life-cycle servants interchangeable, or did farmers choose a particular sex based on household composition, or the specific labor needs of the farmstead? Some evidence from the cottage textile industry in Ireland suggests that the hiring of female servants, who specialized in spinning, and male servants, who specialized in weaving, depended on the age- and sex-composition of the household, as well as how much yarn was bought rather than produced by the household (Gray 2006). In addition, studies of English servants indicate that the sex composition and number of servants was determined by the status and occupation of the household head (Goldberg 1992).

This study seeks to test the null hypothesis that household-related variables are equally associated with the number of male and female servants. These models include variables potentially important to the demand for male or female labor. For example, the occupation of the head may be an important indicator, as farmers may require more male labor, but tailors may require more female labor. Valuations provide insight into the size and quality of landholdings, which may place additional sex-specific demands on labor. The sex of the household head may be predictive of the sex of servants present, as a female headed households may prefer male labor to replace the labor of the absent (usually deceased) male head.

Service in Orkney

The institution of life-cycle service was established in Orkney by the 17th Century, when records show that there were 3-4 servants available to every 10 households (Flinn et al. 1977). Evidence from the current study indicates that individuals identified as "servants" in Orkney had characteristics consistent with life-cycle service as described above. Individuals listed as servants in census returns were predominantly young men and women, 86 percent of whom were between the ages of 12 and 30. In this period, Orkney was characterized by late age at marriage, with the singulate mean age at marriage (SMAM) for females ranging form 29 to 32, and the SMAM for males ranging from 30 to 34 (Sparks 2007). SMAM is a measure average age at marriage computed using the proportion of single people by age, and can be interpreted as the expected number of years lived in the single state for those that marry before age 50 (Hajnal 1953). The mean age at marriage observed from the vital registration data was approximately four to five years lower for both sexes. Servants were present in households of all family types (simple, extended, and compound) and in households throughout the range of landholding values, as measured by valuation rolls. In addition, the majority of servants were born within the study area, or elsewhere in Orkney, indicating that migration for service, while common and an important determinant of age-specific patterns of migration, was a highly localized process (Table 3). There also appears to have been a sex-specific pattern of migration, as females seem even more localized than males.

The Orkney data present an opportunity to advance the study of life-cycle service. The dataset includes information about both individuals and the households they live in. The first part of this study examines household-level predictors of the number of life-cycle servants. The multiple regression models presented below are designed to address issues related to the function of servants within the household economy. Specifically, do variables related to the household

labor pool and consumption requirements, such as the consumer-producer (C-P) ratio, household size, and size and quality of landholdings, predict the number of servants present in the household after controlling for other factors? The second part of this study takes up the issue of the possible effects on employment of servants of the sexual division of labor in farming households. Here, the number of male servants is compared to the number of female servants using multivariate multiple regression in an effort to determine whether household-level variables associated with the household economy have different effects on the sex of number of servant hired. Finally, this study makes a preliminary comparison of the source and sink households of servants. For this analysis, a sample of servants is followed from birth, to census records of their parental households after their birth, and then on to census records of their service households. By linking the data in this way, we can compare the households that send out young adults as servants to the households that hire those servants.

Data and Methods

Data

Two primary data sources are used in this study: individual-level census returns, and valuation rolls. These data were collected from the General Registrar of Scotland (GROS) and the Orkney Archive as part of an ongoing study of the population history of the northern Orkney Islands conducted by the North Orkney Population History Project (Murtha et al. 2008). The decennial censuses provide information on every person at home on the day of enumeration, including age, sex, relationship to the head, and marital status. From these returns, servants are identified, and the composition of the household is obtained. The names of houses and farmsteads, which persist over time, are used to link the census returns to the valuation rolls, which are records of the taxation value of land and buildings. The data used in the first and

second parts of this study represent all households on the islands of Westray, Eday, Papa Westray, Sanday, North Ronaldsay, and Faray for which such record linkage was possible.

Servants were observed at each decennial census interval from 1851-1901. Household-level predictor variables were taken from the census record of the household in which the servant was living at the time of the census. Of the total sample population, servants make up a maximum of 8.8 percent in 1851 and a minimum of 4.2 percent in 1901 (Table 4). Of the sample population aged 12 to 30, a maximum 28 percent are servants in 1851 and a minimum 13 percent are servants in 1891 (Table 5). The sex composition of life-cycle servants is roughly equal, although females usually outnumber males and tend to be 1-2 years older than their male counterparts (Table 6). However, the older average age of female servants is perhaps attributable to the tendency for unmarried women to remain in service, and it does not appear to affect women's age at marriage in the overall population, which is still younger than men's age at marriage, or the age difference between spouses, which also reflects the older average ages of male spouses (Table 7). Figures 2, 3, and 4 compare the age distribution of male and female servants with the general sample population. The observed age distribution of servants is consistent with service as a life-cycle occupation. Note that age-heaping, evident in the distribution of ages in the overall population, is a source of error in the census data.

Household-level Predictors of the Number of Life-cycle Servants: Methods

This part of the study examines which household-level variables are predictive of the number of servants present in the household. Individual-level census returns are used to identify servants and the household-level predictors. Valuation rolls, linked to the census data, provide a proxy measure of landholding size and quality. The predictor variables used include measures of the household, such as C-P ratio, valuation, household type (simple, extended, or compound),

and household size.[8] Other household measures related to the status of the household head may influence the decision to hire servants. These include the age of the head, sex, marital status, occupation, and if the head is an owner-occupier rather than a tenant. Tables 8-11 present the mean values of these variables for households with at least one servant and households without servants. The sample consists of 2917 total observations of 664 households, as households can be observed over multiple census years. Table 12 details the number of households by census year.

A multiple regression model is fit to the data, with the number of household servants, including zero, as the outcome variable. The frequency of life-cycle servants and the number of households that include them decrease over the study period, so a linear variable for census year is included to control for the effects of period. Households can appear in the sample in more than one census year, so standard errors are adjusted by clustering over a household identifier.

Household-level Predictors of the Number of Life-cycle Servants: Results

The results of the multiple regression models are given in Table 13. The main effects model and models with household-level and time interaction terms are presented here. The full model (including both household-level and time interactions) has better fit than the main effects model in terms of the Bayesian Information Criterion and the results of a likelihood ratio test ($\chi^2_{(4)} = 566.21$, $p < 0.00001$, main effects vs. full model, main effects vs. other interaction models also significant). In the main effects model, terms associated with household-level variables have significant effects on the number of servants. Of these predictors, C-P ratio has a large, negative association with the number of servants. On the surface, it seems that servants lower household C-P ratios, but see the discussion for an alternative interpretation. Household size and

[8] C-P ratio is calculated using the weights proposed by Hammel (2005). Household types were assigned using the Hammel-Laslett system (1974) and the definition of compound households established in the background section.

valuation also have significant, but smaller, positive associations. Interestingly, household type, or whether a household contains a simple family, extended family, or is compound, is not a significant predictor. Most variables related to the household head are not significant. However, if the household head is listed as the owner-occupier, rather than a tenant, in the valuation roll, then the household tends to have more servants. In addition, if the head is married, the household is likely to have fewer servants than households where the head is single or widowed.

Pairwise interaction terms for valuation, household size, and C-P ratio were added to the main effects model. Prior studies of the formation and dissolution of households found these interaction terms to be important (Jennings et al. 2009a, 2009b). In addition, the interactions of these variables are related to the balance of household labor and land resources, which is likely to influence the demand for servant labor. Two of these terms, the interaction of valuation and household size and the interaction of valuation and C-P ratio were significant and improved model fit. In addition, the numbers of servants in the population, and several other variables, including household size, change over time, so the interaction of several predictor variables and time were tested. The interactions of time and valuation, which is possibly indicative of inflation, and time and household size were found to be significant (or nearly significant) and model fit was improved.

Once the interactions of household-level variables and time are controlled for, the size of the estimated coefficients of valuation and household size increase. However, the size of the coefficient of C-P ratio decreases, and is no longer significant at the 0.05 level or better. The effect of the marital status of the household head remains largely unchanged, but landowning status is no longer significant and the sex of the head now approaches significance. These findings are taken up in detail in the discussion section below.

Household-level Predictors of the Number of Life-cycle Servants by Sex: Methods

This portion of the study compares the number of male and female servants in the household to determine whether household-level variables are associated with the sex composition of the servant workforce. Put another way, these models seek to understand whether the labor of men and women are largely interchangeable, or if household-level characteristics can predict whether a household has additional male or female servants. Here, individual-level census returns are used to determine the number and sex of the servants and identify household-level predictors. As in the previous model, all households are used, so that the number of male or female servants may be zero. Valuation rolls, linked to the census data, provide a proxy measure of landholding size and quality. The predictor variables used include measures of the household, such as C-P ratio, valuation, household type, and household size. Other household measures related to the status of the household head may influence the decision to hire servants. These include the age, sex, marital status, and occupation of the head, and whether the head is an owner-occupier or a tenant, all of which are included in the model. An additional variable, the worker sex ratio is added to the sex-specific model.[9] This variable accounts for the sex composition of household members of working age (15-65) who are not servants. It is calculated by dividing the total number of males aged 15-65 by the total number of non-servant household members aged 15-65. If the worker sex ratio equals one, then all the non-servant household workers are male, and if the ratio equals zero, then all the non-servant workers are female. The worker sex ratio may determine whether households choose to hire male or female servants in an effort to obtain a desired balance of male and female labor or provide a minimum number of workers of either sex. Tables 14-17 present the mean values of

[9] The worker sex ratio variable was tested in the more general number of servants model described above. The coefficient was not significant, and the estimated coefficients for the other variables did not change appreciably.

these variables for households with at least one male servant and households with at least one female servant. The sample consists of 2917 observations of 664 households.

A multivariate multiple regression model is fit to the data, with the number of female servants and the number of male servants present in the household as the outcome variables. Multivariate multiple regression estimates regression models for each of the outcome variables separately and allows for hypothesis testing of the coefficients of each equation estimated. For example, it is possible to test whether the estimated coefficient of household size in the equation for the number of male servants is equal to the coefficient of household size in the female servants' equation. The frequency of life-cycle servants and the number of households that include them decrease over the study period, so a linear variable for census year is included to control for the effects of period. The statistical package used for this analysis, Stata 11 SE, does not allow for the estimation of robust standard errors by clustering over a variable in multivariate multiple regression, so the repeated observation of households may bias the estimation of standard errors in this portion of the analysis (StataCorp 2009). In addition, multivariate multiple regression does not take into account correlation in the vector of outcome variables. Because the number of male servants and the number of female servants are correlated ($\rho = 0.53$), error may be introduced into the analysis.

Household-level Predictors of the Number of Life-cycle Servants by Sex: Results

The results of the multivariate multiple regression models are given in Table 18. The main effects model and a model with the same interaction terms as the regression model for the number of all servants are presented to facilitate the comparison and interpretation of both portions of the study. A series of Wald tests of linear hypotheses were performed, with p-values adjusted for multiple testing using the Bonferroni method. Here, the equality of estimated

coefficients between different equations is tested (H_0: β_p [male] = β_p [female], where p is the coefficient of interest). The results of these tests are presented in Table 19. In the main effects model, the coefficients of household size, worker sex ratio, the occupation of the head (1 = farmer, 0 = non-farmer), and landowning status (1 = owner-occupier, 0 = tenant) are found to be unequal between the equations for the number of male servants versus female servants. A one-person increase in household size increases the expected number of female servants by a greater, although small, amount than the expected number of male servants. Households with a lower worker sex ratio (more females relative to males) are more likely to hire male servants and households with a higher worker sex ratio are more likely to hire female servants. If a household head is a farmer, the expected number of male servants increases, and the expected number of female servants decreases. In addition, the average number of female servants in landowning households is higher than in tenant households.

The same Wald tests were performed for the interaction models. The results are presented in Table 19. In these models, the coefficients of valuation, worker sex ratio, the occupation of the head, landowning status, and three of the interaction terms (C-P ratio × valuation, household size × valuation, and valuation × time), were not equal between the two equations. A one-unit increase valuation increases the expected number of male servants (0.062) by nearly twice the increase in the expected number of female servants (0.034). The coefficient of household sex ratio changes signs between the male and female equations, so that households with a lower worker sex ratio (more females relative to males) are more likely to hire male servants and households with a higher worker sex ratio are more likely to hire female servants. If a household head is a farmer, the expected number of male servants increases (although the term is not statistically significant at the 0.05 level), but the expected number of female servants

decreases. Finally, if a household head is an owner-occupier, the expected number of male servants decreases, but the expected number of female servants increases. In general, the interaction terms have a larger effect on the expected number of male servants.

A Comparison of the Source and Sink Households of Life-cycle Servants

Household C-P ratio is an important predictor of both the number of servants and the sex of servants in the main effects models. While these associations are suggestive of an important connection between the household labor force and the decision to hire servants, these models do not explicitly compare the source and sink households of life-cycle servants. In this portion of the study, servants are identified in census records, and then found in the birth registers. Using the information from the birth records, they were traced back to the census records to find the last time they were observed in a household with at least one of their parents. For each person for which such linkage was possible, a maximum of four census records were included in the sample: the source household at the latest time the index person was observed, the source household for the census interval after that last observation, the sink household where the index individual is first observed, and the sink household in the census interval before.

The sample consists of 221 individuals who could be linked in this manner, although for some individuals, census or valuation records could not be found one or two of the four records described. In other words, to be included in the sample, individuals must be found in both the source and sink households, but sometimes the source household could not be found in next census interval or the sink household could not be found in the preceding census interval. While this sample is very likely to be not representative of the population and is biased toward individuals whose birth record and the census records of both the source and sink households are found in the study area, some trends can be discerned from this dataset. The C-P ratios of the

households in the four censuses were calculated, and plotted in histograms (Figures 5-8). These histograms suggest that source and sink households have different distributions of C-P ratios. Source households tend to have more variation in C-P ratios, and slightly higher C-P ratios on average (Figures 5 and 7). In addition, source and sink households observed with servants present tend to have slightly higher mean C-P ratios (Table 20). In a direct comparison of the source and sink households with the servant present, the source household C-P ratio tends to be higher than the sink household C-P ratio (Figure 9). These preliminary and limited results bolster the findings of the multiple regression models that indicate the importance of C-P ratio as a predictor of the hiring of servants. Future work, with a larger linked sample, or with data with more precise time controls (this study is limited to 10-year intervals) may be better able to elucidate the relationships between household labor availability and consumption requirements and the hiring and sending out of servants.

This linked dataset can also be used to address the issue of the relative status of the source and sink households. As noted in the background, there has been some debate in the literature about whether servants circulated among households that were largely social and economic equals, or if servants tended to flow from lower-status households to higher-status households. This limited sample provides evidence in support of the first hypothesis. The majority of source and sink households in this sample were characterized by valuations within £30 (approximately 1 standard deviation) of each other (Figure 10). This preliminary evidence suggests that, at least in Orkney, servants circulated among households of roughly equal economic status, as measured by valuation. Whether this trend is true of other regions, or will hold once a larger linked sample is available, is unknown.

Discussion

The results presented here have implications for the study of life-cycle servants and their importance to the household economy. Household C-P ratio is negatively associated with the number of servants present in the household. In other words, as C-P ratio increases by one unit, the expected number of servants decreases, but is not statistically significant in the full model. This finding suggests that servants have an important impact on the household balance of laborers relative to consumption needs and that this relationship changes when the interactions of valuation, household size, and C-P ratio are considered. However, it is difficult to speculate about whether households with more servants have lower C-P ratios because of the servants, or if they have lower initial C-P ratios, and were therefore better off economically and had the resources to provide for servants.

Other household-level predictors are also significantly associated with the number of servants. These include household size, valuation, and interaction terms with valuation. In general, larger households and households with higher valuations tend to have higher average numbers of servants, although the sizes of the effects are small. Households headed by a widowed or unmarried person can be expected to have more servants than households headed by married individuals. In addition, landowners, on average, have more servants than tenants, although this term is not significant in the full model, perhaps because households with many servants were rare in the sample. The importance of time and household-level interactions suggests that the relationships among servants, households, and land are complicated and change over time. Future studies, especially those that consider land use explicitly, may be better able to parse out these relationships.

Perhaps the most interesting findings relate to predictor variables that were not found to be significant. The household type, or whether the household was simple, extended, or

compound, was not a significant predictor of the presence of servants. This result speaks to the ubiquity of servants in Orkney, but one should hesitate before citing it as evidence *contra* Hajnal (1982). The Hajnal hypothesis, addresses nuclear household formation *systems*, rather than nuclear households relative to other forms present within the same system. With this caveat in mind, it does not appear that nuclear households are any more likely to hire servants than extended or compound households within this particular Northwest European household formation system after controlling for the effects of household size, among other factors. This is an interesting finding in light of the suggestion by Hammel (2005) that extended households experienced dampened C-P cycles, and therefore faced a less severe cyclical labor shortage than nuclear households. This dampening effect, if it exists, does not seem to effect the hiring of servants in Orkney.

Another interesting negative finding relates to predictor variables of the status of the household head. The age, sex, and occupation of the head were not significantly associated with the number of life-cycle servants present in the household, after controlling for other factors. These results run somewhat counter to predictions about headship, especially the age of the head, which is usually thought to correspond to stages in household Chayanovian cycles. In addition, one might predict that female-headed households may be facing labor shortages, especially when one considers that men tend to be listed as head rather than women, except in cases where the husband has died. Therefore, the presence of a female head probably indicates that an adult laborer is "missing" from the household. However, it may be that other household members, such as older children and other kin, make up for the lost labor of these missing individuals. Indeed, there did not seem to be an important "widowed head" effect. An interaction term for unmarried female heads was added to each of the models, but the estimated coefficients of the

sex of the head and marital status of the head did not change appreciably and the interaction term was not significant.

The results of the models related to the sex of servants have implications for the debate about the nature of the sexual division of agricultural labor. The coefficients for valuation, worker sex ratio, occupation of the head, landowning status, and several interaction terms were different between the two equations. Households with larger valuations had higher average numbers of servants, but the expected number of male servants increased more than the expected number of female servants for each one-pound increase in valuation. Households appear to hire servants in response to worker sex ratios, as households with higher ratios (more males relative to females) hire more female servants and households with lower ratios (more females relative to males) hire male servants. Holding other factors constant, non-farming heads were more likely to have higher average numbers of female servants than farming households. The same is true for owner-occupiers, whose average female servant workforce was larger than that of tenants. Perhaps these extra female workers were "luxury" domestic servants rather than agricultural laborers.

These findings support the premise that male and female labor was not fungible, but rather that the sexes engaged in different forms of labor, although certain tasks may overlap. Households may seek a desired balance of male and female workers, as evidenced in the differential effects of household worker sex ratio. Alternately, there may be minimum number of males and females required to operate a holding and households hired servants to meet this minimum. Households with higher valuation, and presumably, more land, hired more men per unit increase in valuation than women. In contrast, owner-occupiers and non-farming households had higher average numbers of female servants. These results suggest that female

labor was not exclusively agricultural, as higher average numbers of female servants are associated with non-farming households, where they were likely completing domestic or craft-related tasks. During this period, owner-occupier households represented a social middle ground, as they were probably better off than tenant farmers were, but they were not exceptionally wealthy either, as the wealthiest landowners were commonly absentee landlords and their holdings were leased out to smallholders or managed by factors, and were not listed as owner-occupied properties in the historical records. Thus, the finding that owner-occupiers were likely to hire more female servants than tenants is interesting, but difficult to interpret. It is possible that many of these owner-occupier households were those of the clergy or other non-agricultural professionals, such as lighthouse keepers or merchants, who might have had higher demand for female domestic service. However, future study is needed to confirm or refute this speculation.

While this study cannot settle the precise role of life-cycle servants as part of an "adaptive family economy" (Wall 1986), the strength and significance of several household-level and head-related variables as a predictors of both the number and sex of servants demonstrates the important effects that servants can have on the household economy. In addition, the significance of several interaction variables suggests that these relationships are not simple. Future work in this area might return to the relationships between source and sink households using more completely linked data or using a different data source with better time detail. Another interesting topic for the Orkney dataset would be the investigation of life-cycle service with respect to the transition to marriage. While the literature focuses upon the function of service that allows for the accumulation of savings before marriage, it is less clear with respect to the social contacts made by servants that may lead to marriage. Indeed, a descriptive study of

service and marriage might be informative about the transition to marriage, particularly since it could examine the extent to which servants married family members in the households they worked for, or if they tended to marry people from the islands they moved to for service rather than the islands on which they were born. Future work may also focus on the relationship between service and illegitimate births. Historical records and ethnographic evidence suggest that illegitimate births were not uncommon in Orkney. Since the majority of life-cycle servants were unmarried and living away from their families, it is possible that births to servants may have formed a significant portion of the total number of non-marital births.

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Tables and Figures

Table 1. Chayanov's model of change household composition. Note the use of age- and sex-specific weights (Chayanov 1986: 58).

Years of Family's Existence	Married Couple	Children									Total in Family		Consumers ÷ Workers
		1	2	3	4	5	6	7	8	9	Consumers	Workers	
1 ...	1.8	—	—	—	—	—	—	—	—	—	1.8	1.8	1.00
2 ...	1.8	0.1	—	—	—	—	—	—	—	—	1.9	1.8	1.06
3 ...	1.8	0.3	—	—	—	—	—	—	—	—	2.1	1.8	1.17
4 ...	1.8	0.3	—	—	—	—	—	—	—	—	2.1	1.8	1.17
5 ...	1.8	0.3	0.1	—	—	—	—	—	—	—	2.2	1.8	1.22
6 ...	1.8	0.3	0.3	—	—	—	—	—	—	—	2.4	1.8	1.33
7 ...	1.8	0.3	0.3	—	—	—	—	—	—	—	2.4	1.8	1.33
8 ...	1.8	0.3	0.3	0.1	—	—	—	—	—	—	2.5	1.8	1.39
9 ...	1.8	0.5	0.3	0.3	—	—	—	—	—	—	2.9	1.8	1.61
10 ...	1.8	0.5	0.3	0.3	—	—	—	—	—	—	2.9	1.8	1.61
11 ...	1.8	0.5	0.3	0.3	0.1	—	—	—	—	—	3.0	1.8	1.66
12 ...	1.8	0.5	0.5	0.3	0.3	—	—	—	—	—	3.4	1.8	1.88
13 ...	1.8	0.5	0.5	0.3	0.3	—	—	—	—	—	3.4	1.8	1.88
14 ...	1.8	0.5	0.5	0.3	0.3	0.1	—	—	—	—	3.5	1.8	1.94
15 ...	1.8	0.7	0.5	0.5	0.3	0.3	—	—	—	—	4.1	2.5	1.64
16 ...	1.8	0.7	0.5	0.5	0.3	0.3	—	—	—	—	4.1	2.5	1.64
17 ...	1.8	0.7	0.5	0.5	0.3	0.3	0.1	—	—	—	4.2	2.5	1.68
18 ...	1.8	0.7	0.7	0.5	0.5	0.3	0.3	—	—	—	4.8	3.2	1.50
19 ...	1.8	0.7	0.7	0.5	0.5	0.3	0.3	—	—	—	4.8	3.2	1.50
20 ...	1.8	0.9	0.7	0.5	0.5	0.3	0.3	0.1	—	—	5.1	3.4	1.50
21 ...	1.8	0.9	0.7	0.7	0.5	0.5	0.3	0.3	—	—	5.7	4.1	1.39
22 ...	1.8	0.9	0.7	0.7	0.5	0.5	0.3	0.3	—	—	5.7	4.1	1.39
23 ...	1.8	0.9	0.9	0.7	0.5	0.5	0.3	0.3	0.1	—	6.0	4.3	1.39
24 ...	1.8	0.9	0.9	0.7	0.7	0.5	0.5	0.3	0.3	—	6.6	5.0	1.32
25 ...	1.8	0.9	0.9	0.7	0.7	0.5	0.5	0.3	0.3	—	6.6	5.0	1.32
26 ...	1.8	0.9	0.9	0.9	0.7	0.5	0.5	0.3	0.3	0.1	6.9	5.2	1.32

Figure 1. Chayanov's model of household cycles in C-P ratio (Chayanov 1986: 59).

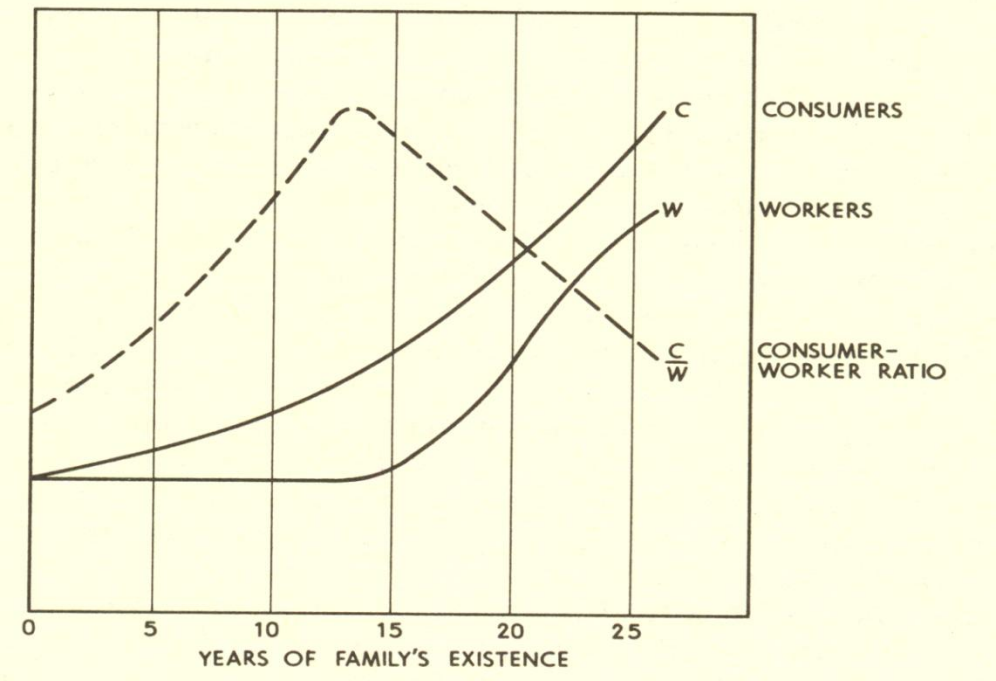


Table 2. Comparison of Hammel's (H) and Chayanov's (C) weighting systems (Hammel 2005).

	Production				Consumption			
	Male		Female		Male		Female	
Weights	Age	Units	Age	Units	Age	Units	Age	Units
Chayanov (C)	—	—	—	—	2	0	2	0
	—	—	—	—	3	0.1	3	0.1
	—	—	—	—	9	0.3	9	0.3
	15	0	15	0	15	0.5	15	0.5
	20	0.7	20	0.7	20	0.7	20	0.7
	50	1	45	0.8	51	1	46	0.8
This model (H)	5	0	5	0.0	2	0.1	2	0.1
	7	0.1	6	0.2	5	0.3	5	0.3
	9	0.2	10	0.5	9	0.5	6	0.5
	12	0.5	15	0.7	12	0.7	10	0.7
	15	0.9	20	0.7	15	0.8	12	0.8
	50	1.0	60	0.8	50	1.0	60	0.8
	100	0.8	100	0.7	100	0.8	100	0.7

Table 3. Birthplaces of Servants, 1851-1901. All servants are observed in the study area. Caithness is the mainland Scottish county nearest to Orkney. Shetland is an archipelago north of Orkney.

	Males	Females
Study Area	731	800
Other Orkney	48	71
Shetland and Caithness	16	38
Other Scotland	14	6
Outside of Scotland	3	3
Missing	1	3
Total	813	921

Table 4. Total Sample Population, by Census Year

Year	Non-Servants	Servants	Percent Servants
1851	4646	409	8.80
1861	4902	351	7.16
1871	4957	334	6.74
1881	5099	250	4.90
1891	4611	197	4.27
1901	4222	178	4.22

Table 5. Sample Population between ages 12 and 30, by Census Year

Year	Non-Servants	Servants	Percent Servants
1851	1261	351	27.84
1861	1325	298	22.49
1871	1308	284	21.71
1881	1449	214	14.77
1891	1290	173	13.41
1901	1105	155	14.03

Table 6. Number and Mean Age of Servants, by Sex and Census Year

Census Year	Males	Mean Age of Males	Females	Mean Age of Females
1851	207	19.42	203	22.99
1861	164	20.89	187	22.77
1871	150	20.97	186	22.47
1881	112	20.97	140	23.39
1891	87	21.23	113	22.19
1901	93	21.60	93	22.52

Table 7. Distribution of Individual Age Differences between Spouses, First Marriages Only (includes both servants and non-servants)

Marriage Year	Number of Marriages	Mean Age Difference (M-F)	Std. Dev.
1851-1860	189	1.49	5.74
1861-1870	313	2.69	5.83
1871-1880	274	2.32	5.43
1881-1890	248	2.52	5.08
1891-1900	219	2.34	4.92

Figure 2. Histograms of the Age Distribution of Male Servants, by Census Year

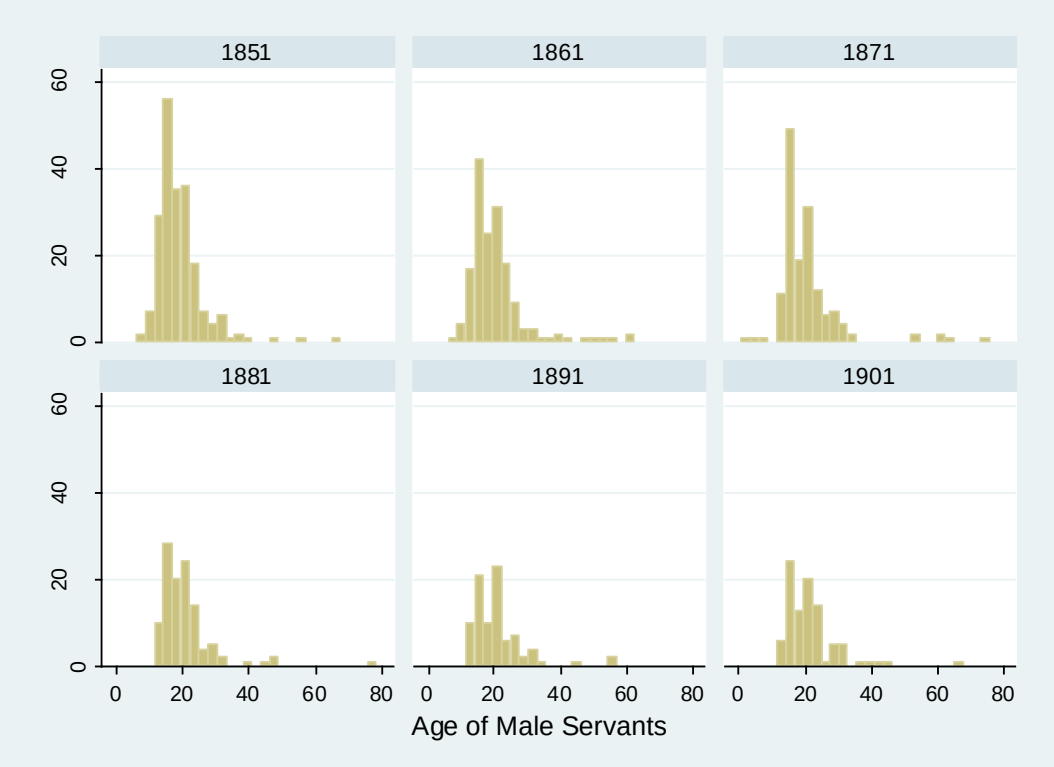


Figure 3. Histograms of the Age Distribution of Female Servants, by Census Year

Figure 4. Histograms of the Age Distribution of the Sample Population by Census Year

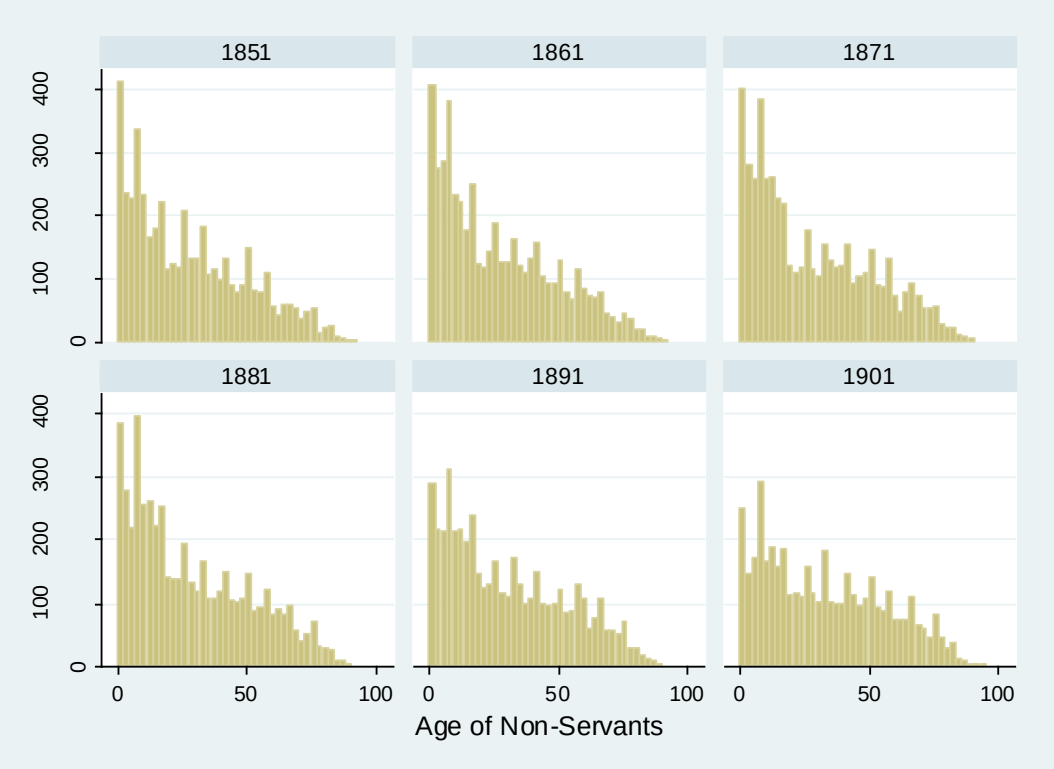


Table 8. Mean Values of the Household-level Predictor Variables for Households with No Servants. The presence of servants is not inconsistent with simple households as defined here.

Census year	Mean CP ratio	Mean Valuation	Mean Proportion of Simple households	Mean Household Size
1851	1.11	6.93	0.45	6.95
1861	1.12	8.05	0.41	7.14
1871	1.11	8.25	0.46	6.97
1881	1.09	10.17	0.41	6.78
1891	1.09	10.55	0.47	6.46
1901	1.07	9.30	0.48	6.11

Table 9. Mean Values of the Household-level Predictor Variables for Households with Servants. The presence of servants is not inconsistent with simple households as defined here.

Census year	Mean CP ratio	Mean Valuation	Mean Proportion of Simple households	Mean Household Size
1851	1.08	40.56	0.30	11.90
1861	1.10	44.01	0.29	11.96
1871	1.09	47.09	0.28	12.17
1881	1.09	69.01	0.31	12.12
1891	1.08	60.86	0.37	12.18
1901	1.07	56.42	0.42	11.28

Table 10. Mean Values of Head-related Predictor Variables for Households with no Servants

Census Year	Mean age of head	Proportion of female heads	Proportion of currently married heads	Proportion of farming household heads	Proportion of owner-occupier heads
1851	54.86	0.24	0.79	0.76	0.02
1861	54.19	0.20	0.78	0.76	0.02
1871	56.04	0.21	0.56	0.78	0.02
1881	56.03	0.20	0.78	0.78	0.02
1891	56.69	0.19	0.78	0.76	0.01
1901	58.03	0.16	0.75	0.82	0.01

Table 11. Mean Values of Head-related Predictor Variables for Households with Servants

Census Year	Mean age of head	Proportion of female heads	Proportion of currently married heads	Proportion of farming household heads	Proportion of owner-occupier heads
1851	58.36	0.21	0.65	0.83	0.09
1861	58.52	0.22	0.68	0.85	0.10
1871	57.77	0.21	0.52	0.85	0.06
1881	56.90	0.18	0.67	0.88	0.04
1891	59.45	0.23	0.65	0.78	0.03
1901	57.57	0.22	0.56	0.85	0.04

Table 12. The Number of Households in the Sample by Census Year and Presence of Servants.

Census year	Households without servants	Households with at least 1 servant
1851	432	167
1861	469	157
1871	487	163
1881	545	140
1891	534	117
1901	544	104

Table 13. Results of Multiple Regression Models for the Number of Servants Present in the Household

	Main Effects	HH Interactions	Time Interactions	Full Model
Household-level variables				
CP ratio	-1.0260 ***	-0.4681 *	-0.8540 ***	-0.3479 +
Valuation	0.0148 ***	0.0849 ***	0.0300 ***	0.0953 ***
Household form (simple=1, all others=0)	-0.0035	0.0563	-0.0090	0.0510
Household size, including servants if present	0.0238 **	0.0486 ***	0.0464 *	0.0693 **
Household-level interactions				
Valuation X Household size		-0.0002 **		-0.0002 ***
Valuation X CP ratio		-0.0600 ***		-0.0559 ***
Variables related to household head				
Age of the head	-0.0016	-0.0021	-0.0013	-0.0018
Sex of head (1=female, 0=male)	-0.0934	-0.1150 *	-0.0580	-0.0798 +
Marital status of head (1=married, 0=single or widowed)	-0.1296 **	-0.1563 ***	-0.0930 *	-0.1206 **
Occupation of Head (1=farm, 0=non-farm)	-0.0082	-0.0497	-0.0140	-0.0546
Land owner (1=yes, 0=no)	0.3341 *	0.3155 **	0.2429 +	0.2255 +
Time Interactions				
Household size X Time			-0.0072 +	-0.0068 +
Valuation X Time			-0.0039 ***	-0.0039 ***
Time Controls				
Time	-0.1080 ***	-0.0984 ***	0.0202	0.0246
Intercept	1.7462 ***	0.9487 **	1.0568 ***	0.3367
BIC	7949.4	7731.258	7642.744	7415.095
R-squared	0.3923	0.4391	0.4559	0.4995

+p<.1; *p<.05; **p<.01; ***p<.001

Table 14. Mean Values of Household-level Predictor Variables for Households with at least one Male Servant

Census Year	Mean CP	Mean Valuation	Proportion of Simple Households	Mean Household Size	Worker Sex Ratio
1851	1.07	50.33	0.27	13.19	0.49
1861	1.09	64.09	0.23	13.22	0.46
1871	1.08	63.56	0.23	13.27	0.47
1881	1.07	62.14	0.27	11.30	0.42
1891	1.07	66.02	0.30	11.83	0.44
1901	1.06	49.81	0.42	8.37	0.47

Table 15. Mean Values of Household-level Predictor Variables for Households with at least one Female Servant

Census Year	Mean CP	Mean Valuation	Proportion of Simple Households	Mean Household Size	Worker Sex Ratio
1851	1.09	44.36	0.31	12.68	0.54
1861	1.10	48.80	0.31	12.17	0.53
1871	1.09	52.34	0.28	11.40	0.53
1881	1.09	84.29	0.35	11.55	0.50
1891	1.09	70.02	0.39	11.04	0.54
1901	1.07	65.29	0.44	10.71	0.54

Table 16. Mean Values of Head-related Predictor Variables for Households with as least one Male Servant

Census Year	Mean Age of Head	Proportion of Female Heads	Proportion of Currently Married Heads	Proportion of Farming Heads	Proportion of Landowning Heads
1851	60.63	0.23	0.85	0.94	0.06
1861	58.67	0.21	0.85	0.94	0.06
1871	57.16	0.23	0.71	0.92	0.06
1881	57.19	0.14	0.84	0.93	0.03
1891	60.27	0.22	0.81	0.95	0.00
1901	56.95	0.15	0.71	0.95	0.03

Table 17. Mean Values of Head-related Predictor Variables for Households with at least one Female Servant

Census Year	Mean Age of Head	Proportion of Female Heads	Proportion of Currently Married Heads	Proportion of Farming Heads	Proportion of Landowning Heads
1851	58.21	0.17	0.85	0.81	0.09
1861	58.37	0.23	0.87	0.82	0.12
1871	57.53	0.19	0.57	0.83	0.05
1881	56.35	0.16	0.87	0.85	0.06
1891	57.45	0.20	0.84	0.71	0.04
1901	56.38	0.25	0.73	0.81	0.03

Table 18. Results of the Main Effects Multivariate Multiple Regression Model for the Number of Servants, by Sex

	Main Effects, Male	Main Effects, Female	Full Model, Male	Full Model, Female
Household-level variables				
CP ratio	-0.6662 ***	-0.32685 **	-0.2548 *	-0.05711
Valuation	0.0077 ***	0.00714 ***	0.0616 ***	0.03382 ***
Household form (simple=1, all others=0)	-0.0168	0.00501	0.0285	0.01312
Household size, including servants if present	0.0080 ***	0.01534 ***	0.0334 ***	0.03621 ***
Worker Sex Ratio	-0.1462 *	0.35711 ***	-0.1900 ***	0.34904 ***
Household-level interactions				
Valuation X CP ratio			-0.0366 ***	-0.01959 ***
Valuation X Household size			-0.0002 ***	-0.00005 **
Variables related to household head				
Age of the head	-0.0018 +	-0.00003	-0.0021 *	-0.00005
Sex of head (1=female, 0=male)	-0.0550 +	-0.00449	-0.0563 +	0.00251
Occupation of Head (1=farm, 0=non-farm)	0.0684 *	-0.07629 **	0.0364	-0.08705 **
Marital status of head (1=married, 0=single or widowed)	-0.0567 +	-0.06769 **	-0.0547 *	-0.05817 *
Land owner (1=yes, 0=no)	0.0029	0.33823 ***	-0.0738	0.30808 ***
Time Interactions				
Valuation X Time			-0.0027 ***	-0.00113 ***
Household size X Time			-0.0022 *	-0.00475 ***
Time Controls				
Time	-0.0577 ***	-0.05015 ***	0.0153	-0.00113
Intercept	1.1400 ***	0.47473 ***	0.3054	-0.08504
R-squared	0.2723	0.3599	0.5482	0.5075

+p<.1; *p<.05; **p<.01; ***p<.001

Table 19. Results of Wald tests of the equality of coefficients across equations.

	Main Effects		Full Model	
Coefficent	Chi-square, 1 df	p-value*	Chi-square, 1 df	p-value*
CP ratio	6.38	0.1272	1.92	1.0000
Valuation	2.39	1.0000	31.41	<.00001
Household form (simple=1, all others=0)	0.61	1.0000	0.31	1.0000
Household size, including servants if present	10.02	0.0172	0.35	1.0000
Worker Sex Ratio	56.22	<.00001	67.89	<.00001
Age of the head	3.27	0.7788	4.71	0.4513
Sex of head (1=female, 0=male)	2.14	1.0000	3.04	1.0000
Occupation of Head (1=farm, 0=non-farm)	17.31	0.0004	13.27	0.0041
Marital status of head (1=married, 0=single or widowed)	0.12	1.0000	34.77	1.0000
Land owner (1=yes, 0=no)	25.52	<.00001	34.80	<.00001
Valuation X CP ratio			13.54	0.0036
Valuation X Household size			63.60	<.00001
Valuation X Time			55.70	<.00001
Household size X Time			4.79	0.4317
Time	1.04	1.0000	0.12	1.0000

*Adjusted for multiple testing using Bonferroni Method

Figure 5. Histogram of the C-P ratio of the Source Household when the Future servant was last observed.

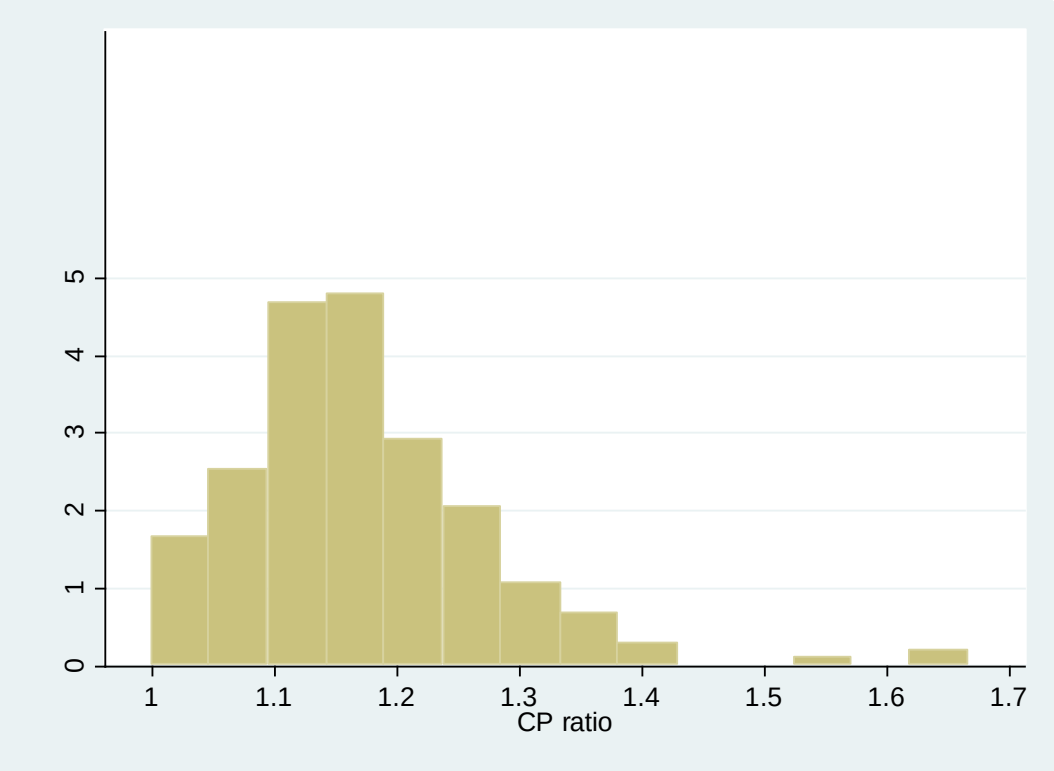


Figure 6. Histogram of the C-P ratio of the Sink Household in the Census Interval before the Servant arrives.

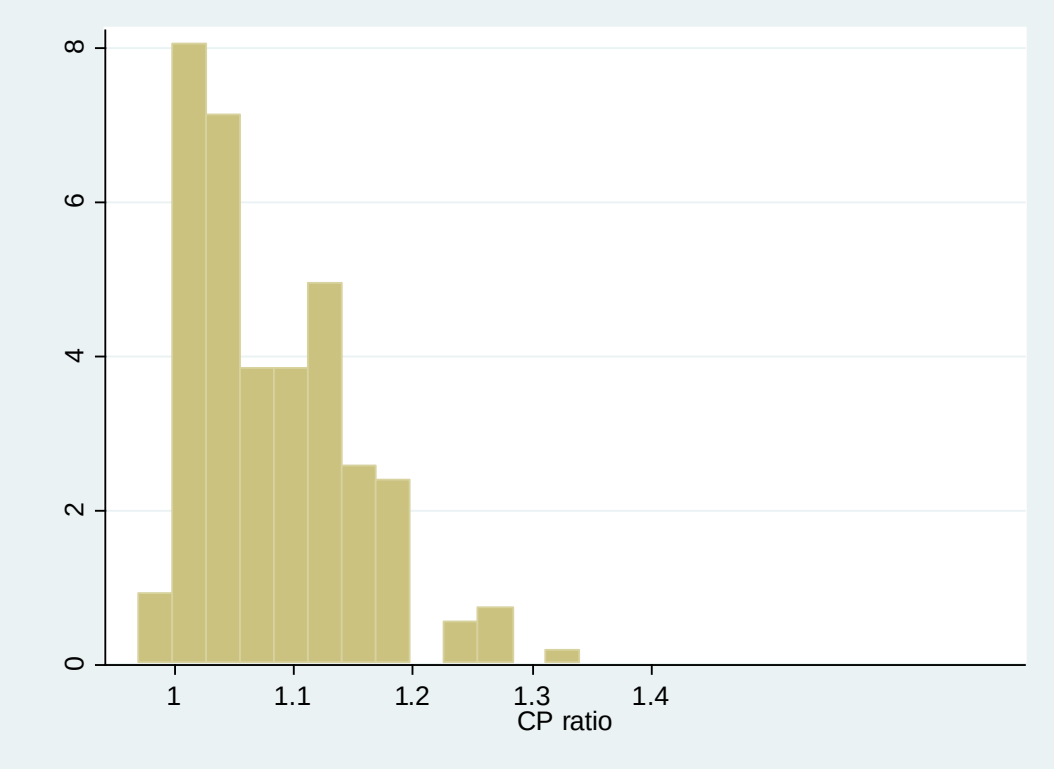


Figure 7. Histogram of the C-P ratio of the Source Household in the Census Interval after the Servant Leaves.

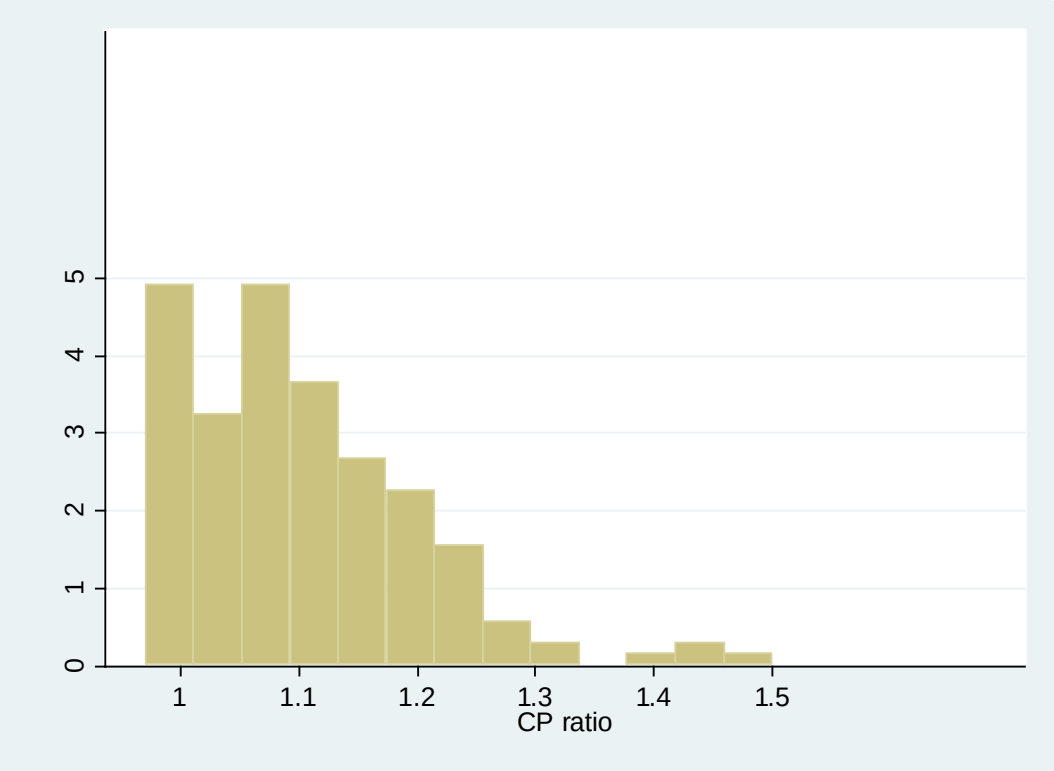


Figure 8. Histogram of the C-P ratio of the Sink Household with the Servant Observed in it.

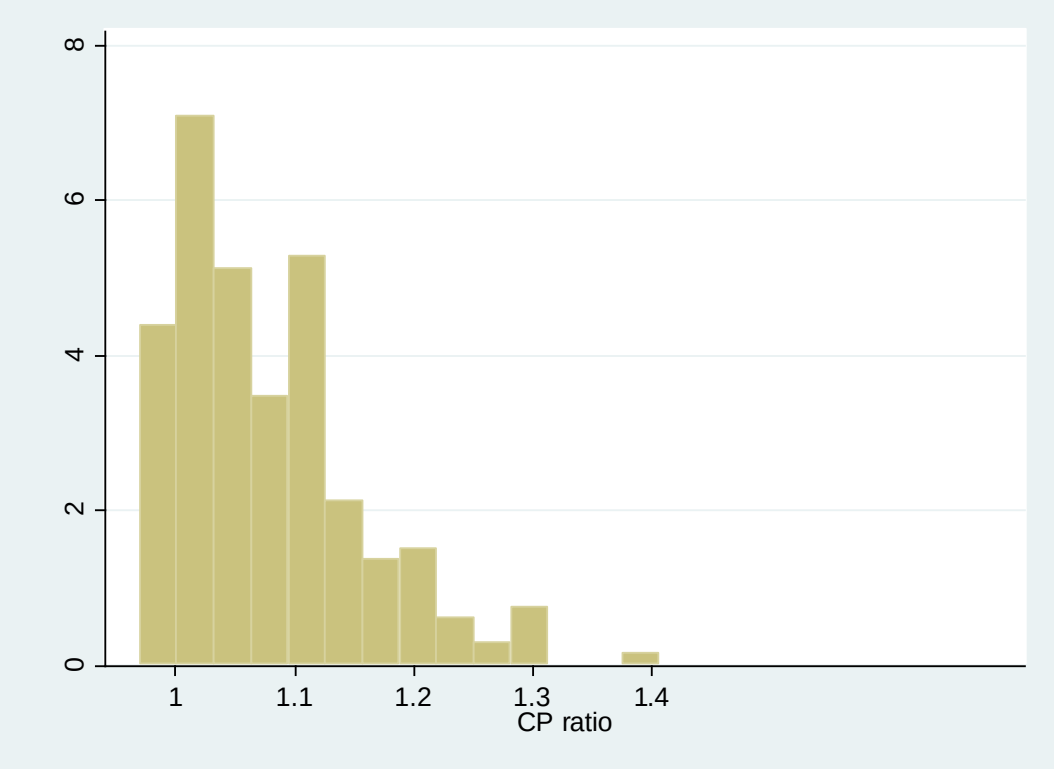


Table 20. Distribution of Household C-P ratio in the Four Census Records.

	N	Mean	Std. Dev.	Min	Max
Sink before servant	192	1.0797	0.0687	0.9706	1.3407
Sink with servant	213	1.0802	0.0765	0.9706	1.4063
Source with servant	215	1.1708	0.1010	1.0000	1.6667
Source after servant	175	1.1055	0.0970	0.9714	1.5000

Figure 9. Distribution of the difference in C-P ratio between Source and Sink Households (both with the servant present). Mean=.087, Standard Deviation=.126

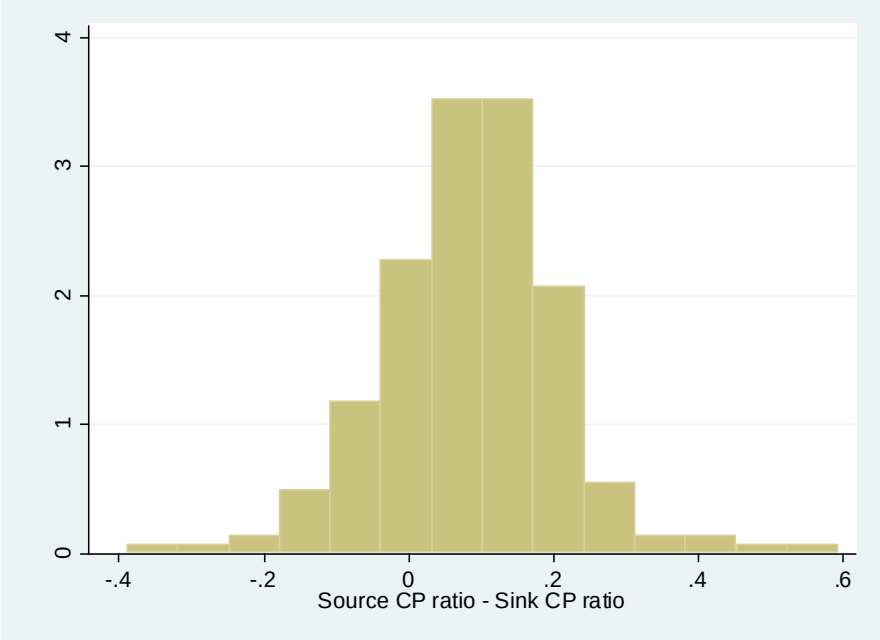
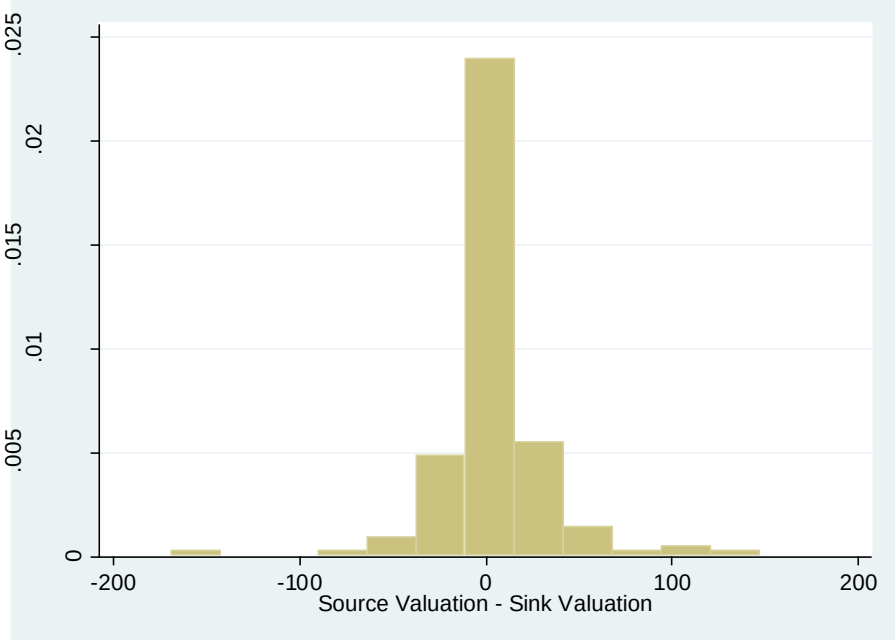


Figure 10. Distribution of the difference in valuation between source and sink households (both with the servant present). Mean=4.32, Standard Deviation=29.15



Appendix A: A contemporary description of servants and hiring fairs.

This account of servants is given by a parson living in the lake country of England around 1890 (Watson 1894). It speaks to many of the characteristic features of the kind of servants under study. He writes (pp. 94-100):

> In describing the lives and homes of the yeomen,[10] I remarked that their sons and daughters went out to service. This spirit of honest independence contributed much to their success, and was one of their chief characteristics. And because it was so I am constrained to describe more at length the virtues of these hard-working sons and daughters, and to hold them up (at least in agricultural matters) for imitation and respect. The lives of this class, except by being bettered, have changed less than those of their superiors, and I shall endeavor to describe them as they exist pretty much to-day, not as they existed in times gone by. All our bread, all our wealth, comes from the land, and sometimes I am afraid we are apt to under-rate those who by their labour win it from the soil.
>
> The farm labourer of the dales, then (and he is more often than not the son of a small farmer or yeoman), is nothing akin to his southern brother. And it is probably no exaggeration to say that he is superior to him in every way in which comparison is possible. The southerner seems unable to lift himself above his surroundings, whilst the northerner almost invariable succeeds. Much of this is probably owing to the fact that he is early sent to school, but at fourteen leaves home to earn his own living. He has been well schooled, in a way, and looks forward to "service." At the half-yearly hiring—Whitsuntide or Martinmas—after he has attained his "first majority," he goes to the nearest country town and stands in the market-place. He is attired in a brand new suit, with a capacious necktie of green and red. These articles he has donned upon the memorable morning, and as a gift from his parents they constitute his start in life. The country barber has left his head pretty much as the modern reaper leaves the stubble, and has not stinted him of grease for his money. As an outward and visible sign of his intention, the lad sticks a straw in his mouth and awaits the issue. For the first hour or so he keeps his eyes bent to the pavement, as though to read the riddle of his life there, but presently gains confidence to look about him. After waiting a greater part of the morning and seeing many of his fellow-men and maid-servants hired, he is accosted by a stalwart yeoman, who inquires if he wants a "spot"—a place, a situation. The lad replies that he does; that he is willing to do anything; and the he will engage for £4 the half-year—"if it pleases." A bargain is soon struck, and the stalwart urchin from the "fell-heads" marches off to lose himself in the giddy gaiety of the Fair. If ultimately he likes his "place," and is well and kindly treated, we may not see him again for a couple of years. During this time he has made himself generally useful, has become a good milker, and has shone conspicuously at hay and harvest. He has proved himself a "fine lad," and has had his wages raised by way of reward. At sixteen or seventeen he is stalwart enough to hire as a man, and now his wages are

[10] Yeomen are small freeholders (my comment).

doubled; he asks and obtains £12 for the year, or even £14 if entering upon the summer half. The farm servants of the dales "live in," and have all found [sic]. They are well fed, well housed, and have their meals at the master's table. But if well fed they are hard worked, and in summer they often rise as early as three or four in the morning. In these parts, which constitute a vast grazing district, the labour of the farm servant is much more general and interesting than that of his southern brother, where the land is arable….A few years ago, during the flourishing times of agriculture, the northern labourer obtained from £35 to £40 per annum, still, of course, "living in"; a few picked men could even command £45. Now, however, that we are come upon times of depression, the best men are glad to work for the first named sum. In proportion, the girls are much better off in the matter of wages than the men. There is probably less competition among them, owing to the fact that there is a great temptation for country girls to migrate and enter service in provincial towns. Here they are not so hard worked as in the farm-houses, and have the satisfaction of being engaged in what they esteem a much more "genteel" occupation.

Many of the men, when about thirty years of age, are able to take small farms of their own. Nearly all the statesmen's sons do this, and probably without any outside help; for, as a class, these labourers are not only industrious but thrifty. I knew a man who had saved £120, which sum he had divided and deposited into three banks. This was his whole wealth, and he told me he did not want to lose his hard-earned savings if the banks should "break." His object was to acquire a small farm, and he has now succeeded.

From the fact of "living in," as nearly all the valley servants do, it need hardly be said that early marriages are rare. All the better men look forward to the time when they can have a farm of their own; and when they obtain a holding, they then look for a wife. This fact alone speaks well for their thrift; but it has its dark side. How far the two things are connected may be a matter of speculation; but it is notorious that the number of illegitimate children in the north is far above average, and most of them undoubtedly are born of the agricultural classes. The registers of the country churches abundantly prove this. Still, it is pleasing to be able to record the fact that in the dales, sooner or later, those who have been wronged "are made honest women of" by marriage.

Appendix B: An Example Life History

Unfortunately, the data available from the North Orkney Population History Project do not allow for the detailed reconstruction of individual life courses with respect to employment and migration. To provide an example of the life history of a life-cycle servant, an autobiographical account is more appropriate. Fred Kitchen was a life-cycle servant in Yorkshire, England. The events of his life, reconstructed (by me) from his account, are summarized here (Kitchen 1981).

1891—Born in Yorkshire, England. Father was a cattleman on a large estate and received wages and a free cottage.
1902—Father died when Fred was age 11. Because of his father's death, Fred could not be apprenticed to his uncle, a joiner.
1903—Fred's older sister leaves school at age 13 and becomes a domestic servant. The family must vacate the cottage on the estate, so they move to a house in the nearby village. Fred's mother makes a living doing needlework and serving tea to travelers.
1904—Fred leaves school at age 13 and works as a "day lad" on a 130 acre farm. Day lads work days, but live at home.
1904—A servant leaves the farm at Martlemas [Martinmas], so Fred decides to take his place and "live in."
1906—Fred leaves the farm to work on the railroad at age 15.
1907—Fred rejoins agricultural service at a different farm at the next Martlemas hiring fair. He is now a horse lad and ploughman.
1908—At age 17, Fred is now a wagoner (horseman). This is a more respected/skilled position.
1909—Fred begin to court the village doctor's nursemaid, Helen (also a life-cycle servant, her father is a coachman).
1910—The farmer's wife dies, and the farmer decides to retire and live with his married daughter. Fred moves back home, and pays his mother for room and board while he works as a carter. Returns to farm service and works as a horseman.
1912—Leaves farm service to work at the colliery. Later promoted to sulphate-house attendant.
1914—Did not have to serve during WWI because of the importance of coal-workers to the war effort.
1915—Marries Helen, after 5-year courtship. They took a house in the village, using Fred's savings.
1916—First daughter born.
1918—First son born.
1920—Helen dies of the flu.
1921—Coal strike wipes out Fred's savings, so he could not buy a smallholding of his own.
1925—Fred remarries and returns to farm labor. He and his family live in a cottage attached to the farm. This farm has a dairy, and Fred becomes the milkman and makes deliveries in the town.
1927—Youngest child born.
1927—Switches farms to obtain a better cottage, as the old cottage was unhealthy for a newborn.
1936—Farm was sold, and Fred stayed on with the new farmer.
1939—Writes his autobiography, encouraged by classes offered by the Workers' Education Association.

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