Spatial variation in household structure in 19th-century Germany

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ABSTRACT
Although historical Germany presents itself as a perfect laboratory for studying interregional demographic differences, the historical family structures in this part of the European continent remain largely unexplored. This study fills the existing gap, and documents the variability of living arrangements using measures of household complexity and entry into marriage based on aggregate data from published statistics of the German census of 1885. We examine the hypothesized roles of the degree of urbanization, agricultural systems, inheritance practices, religion, ethnic background, and demographic constraints on household structure and marital behavior by taking into consideration a wide range of socioeconomic and demographic characteristics. We suggest the division of Germany in 1885 into two main regions with different family systems: an area with low household complexity and high levels of celibacy in the southwest, and an area with higher household complexity and lower levels of celibacy in the north and in the east. Contrary to our expectations, we found that many of the supposedly decisive cultural and socioeconomic differences that are known to have existed in late 19th-century Germany do not appear to have corresponded with these spatial patterns of family composition.

KEYWORDS: historical demography; family systems; household structure; marriage patterns; nuptiality.
INTRODUCTION

In this study, we use aggregate statistical data gathered by the German Empire to fill the existing gap in comparative demographic studies of historical family structures in Europe. By focusing on 19th-century Germany, we take advantage of the substantial internal heterogeneity that characterized the country during this period to gain a better understanding of the patterns and causes of household structure and nuptiality variations. Using aggregate data at the Regierungsbezirk level (governorate), which was derived from published statistics of the census of 1885, we document the contours, gradients, and variability of coresidence patterns using measures of household complexity and entry into marriage\(^1\). The rich data available from the German statistics enable us to study the geographic variability of patterns of family and household, such as, for example, the existence of east-west or north-south gradients. In addition, our covariates include a wide range of socioeconomic and demographic characteristics that allow us to examine the hypothesized roles of the degree of urbanization, agricultural systems, inheritance practices, religion, ethnic background, and demographic constraints on household structure and marital behavior.

We suggest the division of Germany in 1885 into two main regions with different family systems. The south-north divide turns out to be more important than the east-west divide. The river Elbe, which is often seen as a crucial line that separated divergent agrarian regimes and patterns of socioeconomic development in historical East Central Europe, coincided only partly with the dividing line of family systems.

This paper is organized as follows. We open with a discussion of the place of Germany within the scholarly discourse on European historical family systems. This is followed by a more lengthy discussion of methodological issues. Next, a descriptive and explorative assessment of the spatial distribution of the patterns of household complexity, nuptiality, and celibacy in 1885 is presented. Finally, we apply structural multivariate linear models to our datasets in order to gain a better understanding of the processes and structures of interest. We close with a review of our modeling results, and a general conclusion.

WHAT IS SO SPECIAL ABOUT GERMANY?

Post-World War II Germany—and, more recently, post-unification Germany—has provided scholars with a unique opportunity to study demographic differentials within one cultural and

\(^{1}\) We also used data for smaller administrative units (Kreise) within the Kingdom of Prussia to test some of our hypotheses.
linguistic area. The two distinct political entities guided by their own sets of ideological principles in West and East Germany unquestionably altered the demographic development of their respective populations (Kreyenfeld 2004; Klüsener and Goldstein 2009). These differences were later confirmed by the unification process, which brought to the surface pervasive differences in individual demographic behavior, particularly regarding marriage and fertility (Witte and Wagner 1995; Conrad et al. 1996; Kreyenfeld 2003; Cassens et al. 2009).

Situated in the center of continental Europe, and surrounded by countries to the east, west, north, and south, historical Germany is of particular interest to population historians. Germany has within its borders many of the cultural, economic, and religious variations found across Europe, and thus presents itself as perfect laboratory for studying interregional demographic differences, especially in fertility, family formation, mortality, and migration (Knodel 1974, 1988; Vögele 1998; Hochstadt 1999; also Fertig 1999; Lee 2001). However, while researchers have recognized the important relationships between different family systems and demographic processes (Le Play 1871; Lorimer 1954; Davis and Blake 1956; recently Cain 1991; Caldwell and Caldwell 1992; Skinner 1997; Mason 2001; Das Gupta 1997; Szoltylek 2010), the co-residence patterns in historical Germany have thus far been largely unexplored (Bähr 1997; Marschalck 1984; Peuckert 2008; Janas 2005; Rosenbaum 1996; Hennings 1995; Weber-Kellermann 1982; Lee 1981).

Hajnal’s divide in historical European nuptiality patterns relegated the entire German Empire (including its eastern outskirts, where a significant share of the population was Slavic) to the area with predominantly low nuptiality, which Hajnal linked to the stem family, and to prevalence of “life cycle service” (Hajnal 1965; Hajnal 1982, 452; Le Play 1877-1879 vol. I, map facing page 683; see reprint in Fauve-Chamoux and Ochiai 2009, 44-45). Some local studies confirmed that picture, asserting that Germany was dominated by the classic “(Western) European marriage pattern,” in which family formation was contingent upon an individual’s ability to establish an adequate, independent livelihood (Imhof 1976, 202). Other researchers tentatively argued that the German household and family pattern represented an intermediate category between the extremes of the “Western” (nuclear or stem) and “Eastern” (joint) family types (Laslett 1983, 526-530; also Robisheaux 1998, 129-130; Rothenbacher 2002, 276). This intermediate form was...

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2 The terms “coresidence”, “living arrangements”, and “household patterns” are used interchangeably in this paper. Following Bradley and Mendels (1978, 381), we are also keen to differentiating between “family composition” and “family organization.” While the former refers to the configuration of a coresident group as it is revealed instantaneously, the latter is related to the very process whereby composition is generated (basically, the way the household headship is passed from one generation to another).

3 According to Rothenbacher, compared with Europe, the mean household size in 19th-century Germany was of intermediate value; i.e., “larger than the small French household and smaller than the Irish and Eastern European households.” This intermediate position was due to several distinctive features of German household organization, including its inclusion in the Western European pattern of late marriage, on the one hand; and the incidence of extended
characterized by a high age at marriage, high proportions of stem-family households, and high proportions of households with life-cycle servants; as well as by generally low proportions of coresident kin, and other types of complex residential arrangements (Laslett 1983, 526-527). Laterally extended households were said to be non-existent in Germany’s distant past, as well as in more recent years (Mitterauer 1999; Rothenbacher 2002, 276).

The discussion among German ethnologists and demographers of the 19th and early 20th centuries indicated that the “typical” German family type has always been the paternalistically administrated two-generation small family with coresiding servants. Researchers also maintained that there was a fundamental contrast between German and Slavic family composition and household formation (Riehl 1855; Ipsen 1933; Sering 1934; Conze 1940; see also Schlumbohm 2009; Brunner 1956; Mackenroth 1953, 360, 362). This “familial divide” was supposed to have still existed around the turn of the 19th century, and to have determined the diverging demographic trajectories of the Germanic and Slavic populations during the demographic changes associated with the first demographic transition (Knodel 1974, p. 144-147; Haines 1971, 65-66; Harnisch 1986; also Conze 1966). Some local studies have indicated, however, that such a homogenous picture of family pattern in Germany may be misleading (Berkner 1976; Schlumbohm, 1994).

In mainstream historical-demographic scholarship, coresidence patterns among historic societies of Europe were conceptualized as being influenced primarily by institutional, economic, and/or environmental factors. Household composition strategies were also determined by inheritance practices (Rudolph 1995; more in Kertzer 1995, 40-43). With direct reference to Germany, the role of inheritance rules in determining residential patterns was demonstrated by Berkner, who found differences in peasant household structures in two micro regions of Germany due to different patterns of property transfers (Berkner 1976; also Berkner and Mendels 1977). Alderson and Sanderson (1991), in turn, suggested that the key element in the formation of coresidence groups in historic East Central Europe (east of the river Elbe) was the pattern of land ownership and agricultural organization dominated by the agrarian estate system of manorialism. Ruggles (2009) presented a similar point of view, arguing that the differences in family systems both in historical Northwest Europe and North America, and in contemporary developed and developing countries (measured by the residential behavior of the aged), can be successfully explained by the levels of agricultural employment and demographic characteristics (fertility and

households, on the other. However, the proportion of extended households was not very big in Germany, in part because of low life expectancy (Rothenbacher 2002, 276).

Laslett took the village household structures in Grossenmeer in northwestern Germany in 1785 as representative for preindustrial Germany. Close to 69% of all households in Grossenmeer were of nuclear structure, 19.7% were extended, and 9.9% were multiple family households with secondary units disposed lineally. See also Laslett 1977, 97.
mortality in particular), with no recourse to geographical or cultural hypotheses. In a later version of this article, Ruggles stated that this holds true for stem families only, and not for joint families (Ruggles 2010).

Some scholars have, however, given more weight to the potential effects of cultural norms on postmarital residence. Macfarlane indicated that Hajnal's division of Europe seemed to follow the Slav/non-Slav division (Macfarlane 1981), and suggested that the family and household patterns uncovered in Europe by historical-demographers were coterminous with broad “cultural regions.” Laslett and his associates from the Cambridge Group also argued for the presence of a strong “cultural element in the shaping of the domestic group organization” on the continent, and asserted that the pattern of household composition across Europe cannot be interpreted in purely economic terms (Laslett 1983, 558; Smith 1981, 614; Wall 1983, 63). In a similar vein, Reher conceptualized nuptiality behaviour, household formation patterns, and methods of inter-generational property transfer in the Spanish town of Cuenca as normative cultural behavioral patterns, which are often resilient to change (Reher 1988, 71). The latter view has been recently reiterated in mainstream sociological research (Therborn 2004).

Systematic analysis of regional distribution of marriage and household patterns appears to be particularly worthwhile in the German context. The region represents a missing link in existing spatial models of European family, following recent comprehensive investigations of historical Iberian, French, and even Eastern European patterns (Le Bras & Todd, 1981; Rowland 2002; Reher 1998; Szołtysek 2008a, 2008b). A European geography of family forms is not complete without a spatial reconstruction of household composition within Germany. Inter-regional comparisons of coresidence patterns from the published statistics in Germany provide an excellent background against which more detailed studies of family composition in the 19-century German Empire might be carried out in the future. Studying patterns of coresidence in the German context might also contribute substantially to the formulation of further theories regarding the underlying factors of differentials in household composition.

RESEARCH QUESTIONS AND METHODOLOGY

The aim of this paper is to answer four interrelated questions: (1) Are family and nuptiality patterns consistent with the hypothesized east-west distinction put forth by Hajnal and others (Hajnal 1965, 1982; Laslett 1977; also Knodel 1974, p. 144-147; Haines 1971, 65-66)? (2) Is the pattern of land ownership and agricultural organization, notably the Ostelbische socioeconomic divide (Knapp 1887; Weber 1892; Brenner 1976, 40-46), an important organizing principle of household and family structure, as some scholars believe (Alderson and Sanderson 1991)? (3) Are those patterns
consistent with the “agricultural development hypothesis” most recently advocated by Ruggles (Ruggles 2009, 2010)? (4) Are patterns of family and marriage within Germany consistent with the spatial distribution of inheritance practices and settlement patterns (Berkner 1976; see also Sering 1897; Robisheaux 1998; Pfeifer 1956)?

To answer these questions, we make use of the published statistics from the German censuses (see the references for the used sources). There are several reasons for our decision to use the 1885 census as the basis for this study. First, the information contained in the census allowed us to conduct a systematic analysis of household and nuptiality patterns for all of Germany just before the onset of the fertility decline (in Germany, the decline in fertility did not become widespread until 1890; see Knodel 1974: 64ff). While it is true that the later census of 1910 provided more informative statistics on households than the census of 1885, it did so for the largest administrative units (provinces) only. Although census micro-data survived for individual locations, and even for several regions of 18th- and 19th-century Germany, the options for using these data to construct a “nationally representative sample” are still very limited (Gehrmann 2009; Szoltysek 2010). The aggregate-level approach therefore seems indispensable when attempting to determine the basic parameters of coresidence and household formation in historic Germany.

Using the tabulated returns of the 1885 census for household structure analysis does, of course, have its limitations. Because the specification of kin membership in coresidence groups was not provided, these data are not useful in conducting an analysis that seeks to provide a more detailed breakdown of living arrangements. However, household complexity can be measured from routine aggregate census data on the number of households, and on the population classified by age, sex, and marital status, by using the indices commonly applied in family demography (Burch 1967, 1970, 1980; Burch et. al., 1987; Parish & Schwartz, 1972; Dandekar and Unde, 1967). One of these indices is the average number of adults per household (APH), where A is the total adult (male and female) population aged 15 (or 20 or 25) and over, and H is the number of households. If everyone

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5 German population censuses were carried out quinquennially since 1875. However, up until 1910, they usually provided little information about household characteristics beyond the general number of households, which were usually divided into three basic categories (Rothenbacher 1997; 2002, 278, 297. The census definition of “household” between 1875 and 1910 encompassed both biological and other kin relations criteria, as well as socioeconomic criteria. A group of people was considered to be a coresidential household group if they were living together on the basis of shared resources. Not only biological members of the family and other related persons were included in this category, but also servants, boarders, and lodgers (Rothenbacher 2002, 278). Literally: “A household are all persons united by a residential and economic entity. Independent persons living alone, who have a living quarter of their own and a domestic economy of their own, are treated as separate households and entered into special counting lists. Other persons living alone are incorporated into the list of that household, where they reside (that provides the domestic economy for them), even if they do not receive food there” (English translation from SDRNF-32; 1888, page 8*).

6 It is hoped, however, that the ongoing data collection project at MPIDR will bring this historical census micro-data to light in the near future (see the project “The Golden Age of Statistics” at www.demogr.mpg.de).
followed the neolocal household formation, most families would consist of conjugal family units composed of parent(s) with offspring under a certain age. If widowed (or divorced) parents and young singletons who live alone are excluded, the average number of adults per residential unit should be close to 2.0. Kuznets described the APH as a measure of “jointness or apartness of adults;” that is, the “degree to which adults related by blood, marriage, or adoption live together or apart” (Kuznets 1978, 188-189).

The second measure of complexity is the number of marital units per household (MUH). This number is obtained by dividing the sum of absolute numbers of married, widowed, and divorced males, as well as of widowed and divorced females, by the total number of households in a given region (see Parish and Schwartz 1972, 157). In an ideal population that follows neolocal household formation rules and practices universal marriage, no married individual would coreside with anyone except his or her spouse and unmarried offspring, and all widowed and divorced persons would live alone. In such a society, the index MUH would be expected to equal 1.0. Figures above one indicate either coresidence of married couples or coresidence of a married couple with a widowed or divorced person. In this paper, we use the number of marital units per 100 households in order to get larger numbers that can be used in our models.

Scholars have found a strong correlation between APH on the one hand, and MUH and some more direct measures of household complexity on the other (Parish and Schwartz 1972, 158-160). Similar tests performed on our German dataset have, however, yielded less optimistic results. The correlation between APH and MUH appears to have been significantly weaker than it was in late 19th-century France (0.24 compared to 0.87; see also FIGURE 1). Several regions displayed fairly low levels of MUH (below 110), but a relatively high average number of adults per residence (2.4 persons or above). Because the census definition of household in Germany placed non-relatives such as servants and permanent lodgers into co-resident groups, the values of APH measure encompass more than just the extent of intergenerational coresidence, depending on the overall share of those groups in the population. Thus, in practice, the APH measure cannot be used to assess the “jointness or apartness of adults” in Germany of the 1880s.

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7 Neolocal residence rules imply that upon marriage, each partner is expected to move out of his or her parents’ household and establish a new residence, thus forming the core of an independent nuclear family. Neolocal residence involves the creation of a new household each time a child marries, or even when he or she reaches adulthood and becomes economically active.

8 The share of servants in German population in 1882 was slightly lower than in France in 1876 (6.2 %, compared to 6.5%; for Germany, see SDRNF-2, 1884, 80*-83*). An overwhelming majority of them was celibate, and only very few of them (1-3%) married before the age of 30 (SDRNF-2, 1884, 106*, 109*). Although service in Germany was predominantly a life-cycle condition, 27% of male and 17% of female domestic servants were above the age of 30 (corresponding figure for combined sexes among farm servants was 18.9%; see SDRNF-2, 1884, 96*-97*). Since servants of all sorts were assigned membership in the households of their employers, when the numbers of those older...
Our second index of household complexity (MUH) is generally less problematic. Since most servants are unmarried, the presence of servants in a household does not increase the number of marital units, and therefore does not interfere with the index. Meanwhile, married, widowed, or divorced persons who coreside in the household, but who are not related to the head’s family (and not counted as a separate economic unit), increase this figure, despite the fact that there is no direct indication that more kin are co-resident in the household. On the other hand, unmarried coresident relatives are insensitive to the measure, even though their presence in the household serves to extend the family beyond the conjugal core. Our data range from 100 to 120 marital units per household on average (median=108), while the data for France range from 95 to 129 marital units in 1876 (Parish and Schwartz 1972, 160); thus, the range of our data is smaller.

One difficulty in working with MUH is that the statistic cannot be easily judged as large or small without a priori expectations. Also, the MUH cannot be easily translated into more insightful measures of household complexity commonly used in family history. Since large quantities of census microdata are not available for historical Germany (see ft. 5 above), we decided to instead use some comparative inferences. We took historical census microdata from late 18th-century western Poland, which became part of the Prussian Kingdom between 1770s and 1790s, and later part of the German Empire. Using these data, we classified all of the households (11,000), both according to their MUH component, and by using formal typology of relationships between coresident kin (Hammel and Laslett 1974) (see FIGURE 4). Even though the MUH measure proved to be a relatively good predictor of residential complexity, as measured by the proportions of extended and multiple-family households (Pearson’s r = 0.74), we found significant variation in the proportions of complex families within a relatively small range of MUH values, which was quite comparable to that observed in Germany. Of all the location points within that range of MUH in than 25 years are added to the numerator of the APH measure, they increase the value of the measure without actually indicating a changing kin composition of domestic groups. The scale of this effect was mitigated by the generally small number of servants per household in Germany (0.29 in 1885), but there were strong regional differences in this pattern. Inmates and lodgers added to the problem. The only available statistics for the lodging subpopulation come from the 1910 census. In this year, 9% of all family households had lodgers, again with Bavaria exceeding the national average by almost 3%. Strikingly different was the situation in 48 big cities, where close to one-fifth of households had coresident lodgers.

Departments are, however, usually smaller than Regierungsbezirke, which might explain the bigger data range in France. The variation within the Prussian districts (508 Kreise in 1885, compared to 63 departments in France) exhibits much higher variance than in France (92-133). See discussion in subsequent sections.

A comparative approach to family and household structure must allow for the fact that household-level measures of family may be affected by variations in demographic conditions (Ruggles 2009, 252). The importance of demographic constraints on multigenerational families was first proposed by Levy (1965), and the first empirical estimates of the effect were published by Coale (1965) in the same volume.

An increase in MUH by one standard deviation (0.06) causes an increase in the proportion of complex households of 4.73%.
Poland, 80% displayed values of between 11% and 32% of complex households, and 64% of them were clustered within the 10% range (10%-20%). Assuming that the demographic conditions of late 18\textsuperscript{th}-century western Poland resemble those of the German Empire some hundred years later\textsuperscript{13}, the variation in the value of the MUH index for various German regions in 1880s might translate into a dispersion of complex households of 5% to 25% (most probably between 10% and 20%). This hypothesized variation within Germany would correspond well with values observed for other historical populations of northwestern Europe (Bradley and Mendels, 1978, 383; Wall 2001).

It should be noted that a measure such as marital units per household is only a very crude indicator of household behavior and household composition strategies. MUH represents household complexity only in the broadest possible sense; i.e., it suggests the extent to which adults of all types tend to coreside, rather than to live independently in their own households (Berkner 1977; also Burch 1970; Burch 1980, 28-29). Relying upon MUH is much more problematic if the goal is to gain greater insight into the nature and character of the actual coresidence, and to arrive at a more elaborate classification of household types or living arrangements (Hammel and Laslett 1974; Ruggles 2009). In Germany, as in other parts of Western and Central Europe, the overall share of complex families was defined as the combined share of poly-nuclear households and of households with one or more types of extended kin in coresidence, even though the share of the latter was much more substantial than that of the former\textsuperscript{14}. For 19\textsuperscript{th}-century France, Parish and Schwartz (1972, 160-162) proposed two inflection points between the nuclear and stem family systems, and the stem and joint family systems, of 106 and 123, respectively (the “full” joint family system value of MUH would equal 144). The German median value of MUH is very close to the first of these two inflection points (FIGURE 1), which may suggest a prevalence of stem family composition in 50% of the German regions studied. However, without more detailed household-level statistics, it is difficult to determine whether the household extensions observed in Germany result primarily from the stem family life cycle and its related pattern of headship transmission, or whether they represent the reincorporation of extended kin at some point in the development of the household. The stem

\textsuperscript{13} In those areas, nuptiality characteristics were just above the lower boundaries of the “Western European marriage pattern,” and the prevailing nuclear family system revealed traces of stem family organization (Szoltysek 2007; also Kuklo 2004). In these areas, the fertility decline started slightly later than in other areas, but definitely not later than in all other regions of Germany (Knodel 1974, 55, 65).

\textsuperscript{14} The number of married couples per household was only 80 in the 1885 census. The remainder were widowed people (females in particular). It was only by including widowed/divorced females into the calculation of the MUH index for Germany that its value was raised above the level of 100. Therefore, the latter could be the driving force behind the higher number of marital units per household. However, the correlation between the percentage of widowed/divorced women in the population and the regional values of MUH was weak, but significant (.24; sig. at 0.05 level). Thus, the predictive power of the percentage of widows/divorcees was also weak (R squared=0.058). This was caused by a clustering of populations with a large share of widows in one part of the country, and those with a large share of widowers in another one, without much correspondence with the spatial distribution of the MUH index. Of course, we cannot be sure whether all, or even most, widowed females in coresidence were kin, and not lodgers.
family system may include a variety of household forms, and there is widespread disagreement on how to define it, particularly with quantitative measures in the cross-section (Rebel 1978, 256-260; Berkner 1976, 84-91; Verdon 1979; Ehmer 2009; Saito 1998; also Kertzer 1995, 377). All in all, however, the great advantage of using the MUH measure is that it enables us to conduct a systematic cross-sectional analysis of the basic parameters of household composition and marriage patterns for all of Germany just before the onset of the demographic transition.

Finally, we used the singulate mean age at marriage (SMAM) of women and the proportion of women still unmarried at ages 45-49 as measures of nuptiality and celibacy. The singulate mean age at marriage is an indirect measure of the age at marriage in the absence of direct measures of ages at marriage (Hajnal 1953; Schürer 1989). The proportion of unmarried women aged 45-49 is a measure of the proportion of people who never marry. Both measures were used by Hajnal in constructing his dichotomous model of marriage patterns in Europe. In the Western European marriage pattern, the age at marriage is high and the proportion of never-married people is also high (Hajnal 1965). Both measures can be easily calculated from tabulations of ages by marital status for both sexes. Both indicators are based on cross-sectional data, and also use information from past decades. Thus, the validity of these indicators may decrease when rapid changes are occurring in the ages at marriage, or in the proportions of people who never marry. This is, however, not the case for this time period in Germany (Ehmer 1991, 292).

EXPLORATIVE RESULTS

The scatter plots in FIGURE 3 display spatial trends in the three dependent variables by breaking the values in the regions down by the longitude and latitude value of the region’s centroid. For MUH, the values seem to increase slightly from north to south, as well as from west to east. The latter finding might support the hypothesis that household complexity increases when moving eastward. However, the trend is very weak, and the regions with the highest MUH values are in the western part of Germany. In addition, there seems to be no continuous linear spatial trend for the SMAM. Its values decrease from the west to the center, and then increase again towards the east. The spatial trends are much more pronounced only for the variable displaying the share of single women aged 45-49. Again, however, the east-west pattern seems to be an artifact, which is caused by the distinctive north-south gradient in the western part of the country. If the southern regions are excluded, the east-west trend disappears. The distinctive north-south pattern is probably to some extent a legacy of marriage restrictions, which were particularly tight in southern Germany in the first half of the 19th century (Knodel 1967). These restrictions were lifted in the late 1860s, when this cohort was aged 25-30.
A closer examination of the spatial distribution of the MUH index (FIGURE 4a) reveals a relatively well-defined clustering of the variable across space. The two classes with higher values (above 109) are situated in the northern part of Germany, and are basically within the territory of the Kingdom of Prussia\(^{15}\). Seven distinct—albeit highly dispersed—regions have the highest proportions of MUH. One group includes East Prussia, Pomerania, and Posen in the east. Four other regions are spread over the northwestern and central parts of the country. The “cold spots” of household complexity are also dispersed across the country. The southern part of Germany (Lower Bavaria, Württemberg, and Alsace-Lorraine; as well as the Kingdom of Saxony, Silesia, and the Rhineland) tend to have lower numbers of marital units per household. The border between the more complex cluster in the west, and the areas to the south and southwest with smaller MUH values, seems to loosely correspond to the historical dividing line between impartible and partible inheritance systems, as well as to the religious division between Protestants and Catholics. No clear east-west division in marital units per household can be detected in Germany of 1885. A larger concentration of marital units in the households of the east is counterbalanced by similar tendencies seen among the regions situated to the northwest, despite the large Slavic population and the dominance of a manorial agrarian regime in the east.

The geographical pattern for SMAMF (SMAM for females) in 1885 (FIGURE 4b) does not overlap with the spatial characteristics described above\(^{16}\). The only suggestive features appear to be the existence of the “center,” with moderate low ages at marriage, which runs from the North Sea to the Bohemian border, with important extensions to the southwest. While the three “Slavic” regions in the east have marriage ages that are lower, these ages are still considerably above the level suggested by Hajnal to be indicative of the “Eastern European pattern” (21 years; Hajnal 1982). Four clusters with the lowest ages at marriage are scattered within, or located near, the central zone of lower marriage ages. The regions that are characterized by high marriage ages are dispersed across Germany’s peripheral regions: East Prussia, Vorpommern and Mecklenburg-Strelitz, areas along the Dutch border, Württemberg-Bavaria, and central Silesia.

Interesting continuations and discontinuations appear in the spatial distribution of the proportions of celibate females aged 45-49 (FIGURE 4c). By and large, the central regions with early ages at marriage were also characterized by relatively low rates of female celibacy. Southern regions characterized by a late age at marriage also had large numbers of never-married females. On the other hand, some areas with the highest age at marriage turned out to be relatively low on the

\(^{15}\) Most of the eastern part of these territories is within the borders of present-day Poland.

\(^{16}\) We assumed that patterns of entry into marriage should also affect the composition of the household (see more in the modeling section). However, see Barbagli 1991 on the ambiguous relationship between nuptiality patterns and household composition in some parts of Europe.
scale of proportions of celibate women (in the northeast). All this suggests that two behavioral patterns are at play: one which is related to late, but nevertheless almost universal marriage (East Prussia); and another in which women either married late, or did not marry at all (the south). The spatially concentrated pattern of high nuptiality covered territories that are heterogeneous in their characteristics: these regions are ethnically mixed, and are both industrialized and rural, and Catholic and Protestant.

Large units of analysis may mask the significant internal heterogeneity of the given region, affecting the efficiency of estimations (see discussion in Brown and Guinnane 2007). To test the accuracy of our findings, and to assess heterogeneity potentially missed by focusing on the larger units, the number of marital units per household was calculated for Galloway’s et al. (1994) 407 time-constant districts (Kreise) of the Kingdom of Prussia in 1885\(^{17}\).

Not surprisingly, **FIGURE 4d** reveals a much more variegated pattern, although the observed variation seems to be smaller than might be expected\(^{18}\). As a result, the spatial pattern of MUH for districts corresponds quite well to the regularities observed previously at a higher level of aggregation. Also, within Prussia, the regional distribution of the number of marital units per household displays the prevailing north-south gradient. The northern part of Prussia contains the majority of the districts with the highest numbers of marital units per household. The southern part of Prussia is a mixed area with all possible levels of MUH. It also contains districts with very low or low numbers of marital units per household in the southwest (Rhineland) and in the southeast (Silesia).

A separate inspection of the spatial distribution of each of our dependent variables produced mixed—and partly vague and inconsistent—results. There are only a few macro-regions in which spatial consistencies are found across all dependent variables. To gain a better understanding of the interconnection between three dependent variables in a geographic space, we used a hierarchical cluster algorithm based on Ward’s minimum variance method (see **FIGURE 4e**)\(^{19}\). We created two distinct clusters with different combinations of interactions between our dependent variables. Each

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\(^{17}\) The Kreis was the smallest administrative unit for which demographic and household data was available. These 407 time-constant districts for the period 1875-1910 were constructed using information on administrative border reforms at the district level in Prussia during that period. In this period, the number of districts increased from 458 to 586. Based on the available information, 407 regional units, which stay constant over time, were constructed (Galloway’s et al. 1994). Unfortunately, the remaining two dependent variables cannot be constructed with this material.

\(^{18}\) Comparing descriptive statistics for (A) 36 governorates (Regierungsbezirke) and (B) 508 districts (Kreise) of Prussia, we get the following results (MUH only): (A) Min-Max= 101-119; St.dev=4.55; (B) Min-Max= 91.8-132.6; St.dev.= 6.41.

\(^{19}\) Our intention was to arrive at an overall pattern of household structure and nuptiality in the one encompassing notion of the diversity of family systems.
of the main clusters was subdivided into two sub-clusters that are closely related to each other (TABLE 1).

Cluster 1 (dark-red color on the map; in the center and in the north and northeast of Germany) consists of regions with relatively high proportions of marital units per domestic group, moderate ages at marriage, and low proportions of women who never married. Cluster 4 (light red; mostly Saxony in the heart of Germany) has similar characteristics, and exhibits the lowest values for the age at marriage and the proportion of celibates, but still has relatively high degrees of household complexity. The other two clusters (2-3; dark and light blue; mostly in the west, south, and southeast) have higher ages at marriage, and a higher share of never-married females. As for the latter indicator, this is particularly true for cluster 2 (the most southern regions), where the average values are twice as high as in clusters 1 and 4. Cluster 2 also exhibits the highest mean age at marriage and the lowest number of marital units per household. A final distinction is therefore made between clusters 1 and 4 on the one hand, and clusters 2 and 3 on the other. These two categories distinguish between regions with relatively high levels of household complexity, low ages at marriage, and low proportions unmarried people; and regions with low degrees of household complexity, a high age at marriage, and large proportions of celibate people. This pattern corresponds with a general north-south divide. Most parts of pre-Napoleonic Prussia belonged to the clusters with a higher number of MUH and earlier and more universal marriage. The south (Bavaria, Württemberg, Baden, Alsace-Lorraine, but also Prussian Silesia) and the west (Ruhr area, southern Westphalia, as well as areas close to the Dutch border) generally display the opposite pattern. We can therefore divide Germany into two main regions: the center, the north, and the east with higher household complexity and higher levels of female nuptiality; and the west and south with lower rates of coresidence, higher female ages at marriage, and a more pronounced role played by female celibacy later in adulthood.

This division appears to be similar to the distinction made between the two regions on either side of the river Elbe, but the observed pattern also includes territories to the west of the supposed dividing line. The administrative units inhabited mostly by Catholics in the south and west of Germany belonged to clusters 2 and 3, although a large number of Catholics also lived in the eastern, Slavic regions of the first cluster. The region characterized by partible inheritance was also mostly part of clusters 2 and 3. These clusters also include most of the administrative units with the highest shares of older people. We can therefore conclude that many of supposedly decisive within-country cultural and socioeconomic divisions in late 19-century Germany do not seem to correspond to spatial patterns of family composition.
MODELING APPROACH

To take apart this puzzle, structural multivariate linear models were applied to our dataset. Our dependent variables were marital units per household (MUH), female singulate mean age at marriage (SMAMF85), and the percentage of females aged 45-49 years in permanent celibacy (SHS85). Independent variables were operationalized in such a way as to capture potential demographic, socioeconomic, and cultural effects (the general summary is given in TABLE 2). To control for demographic effects on the incidence of multigenerational families, we used the share of the population aged 65 and older [SHPOA6585] (SDRNF-32: 96-131). A higher share of elderly people could potentially lead to a higher share of marital units per household. Since most of the complex households detected in Germany in 1885 were actually extended family households containing widowed people, the proportion of widowed and divorced people [SHWIDV] (SDRNF-32: 154-199) was expected to develop in the same direction. We also included the mean household size for all regions in 1885 [MHH85] (SDRNF-32: 94f.), which represents the most basic demographic characteristic of a household. To indicate rurality, we used population density (people per km²) [LOGPD80] (SDRAF-57: 26-28), as well as the share of population in localities with fewer than 2,000 inhabitants, both for 1880 [PS200080] (SDRAF-57: 26-28). We expected higher density areas and more urbanized areas to have higher shares of unmarried people, higher ages at marriage, and fewer marital units per household.

To measure regional agricultural patterns, we selected five different variables, some of them related, thus potentially causing multicollinearity in our regression models. The first variable chosen was the share of people whose occupation in 1882 was agriculture [SHPOAG82] (SDRNF-112: 20). The usage of the MHS variable as covariate might raise some endogeneity problems, as it might be influenced by the number of marital units per household. Earlier comparative research used mean household size to indicate complexity, based on the reasoning that larger households tend to be more complex (recently Bongaarts 2001). However, differences in household size seem to be determined primarily by fertility, and not by the level of complexity (Parish and Schwartz 1972, 157; also Burch 1970). In Germany, the range of this indicator is from 4.11 to 5.38 for the German Regierungsbezirke (mean of 4.68 and a standard deviation of 0.27). Recalling that the range of MUH values is only from one to 1.2, we could argue that the differences in the mean household size were mostly driven by other factors, such as numbers of coresiding children or non-kin. Levels of fertility in Germany showed a wide dispersion in the second half of the 19th century, whereas none of the indices of the Princeton European Fertility Project shows a change of more than 10% prior to 1885.

We wanted to include more demographic variables, such as the indices used by the Princeton European Fertility Project, but we would need fertility data of about 30 years before 1885 to properly assess the influence of fertility on the availability of kin in the middle generation. Unfortunately, this data is not available. Fertility measures of 1885 tell us only about children, who cannot form marital units in that year. The proportion of married women would be just a complementary measure for the mean age at marriage and the share of never-married women, and is therefore not included.

The population density variable was highly left-skewed. Therefore, we decided to take the logarithm of this variable for the modeling.

Ehmer (1991, 149) pointed out that, unlike in England, marriage opportunities were lower in the cities in Germany.
This variable was selected because of the recent empirical findings about its positive effect on residential patterns worldwide (Ruggles 2009). The average size of farms [ASF1882] (SDRNF-5: 8-107) was also included, based on the expectation that larger farms will have more servants and a stem family structure, and therefore higher percentages of unmarried people, higher ages at marriage, and more marital units per household\textsuperscript{23}. The percentage of servants within the agriculturally active population in 1882 [SHSERV] (SDRNF-4.1: 14-18, 26-30) was further taken into account. This was based on the assumption that a high share of agricultural servants should normally increase the age at marriage, and lead to neolocal household formation (Laslett 1977; Hajnal 1982; Fauve-Chamoux and Ochiai, 2009, 23-24; Macfarlane 1978; Hartman 2004)\textsuperscript{24}. A partly inverse relationship may be illustrated by the share of day-laborers [SHDAYLAB] (SDRNF-4.1: 30-34). The higher the proportion of day-laborers, the smaller the share of unmarried people, and the lower the age at marriage\textsuperscript{25}.

A dummy variable was used to control for the region east of the Elbe river, where the manorial system based on large landowning estates was most widespread. Since these estates employed fewer servants but more agricultural workers (day-laborers), they created a means of subsistence for many people who were unable to find a niche through more traditional paths, such as inheritance or marriage (Fertig 1998, 2003). By breaking the “chain between inheritance and reproduction,” the manorial system of the 19th century encouraged higher nuptiality, earlier entry into marriage, and neolocality\textsuperscript{26}.

The share of mining employees in 1882 [SHMEM82] (SDRM 1884.1: III, 1-17) was included to indicate the different behavioral patterns of an important sub-group of the population outside of agriculture. Miners constituted a specific social group with distinct family and reproductive behaviors (Haines 1971, 1977, 1979), including an early age at marriage for females, high marital fertility related to the high demand for large surviving family sizes, as well as high male mortality\textsuperscript{27}. We argue that the higher the share of miners, the smaller the proportion of celibate

\textsuperscript{23} Since the variable ASF1882 captures both farms of peasants, as well as large landowning estates, its relationship with the dependent variable cannot be assumed to be equivocally linear. Up to a certain point, an increase in farm size should also increase the share of celibates as an effect of impartible inheritance; while after that point, the share should decrease as an effect of the manorial system, thereby creating more opportunities to start a family.\textsuperscript{24}

\textsuperscript{24} There could be substantial numbers of life cycle servants within communities adhering to stem-family organization (see Fauve-Chamoux and Ochiai 2009, 23-24; Saito 1998).

\textsuperscript{25} The share of farms that operated only rented land, the share of farms of 20-100 hectares, and the share of farms with more than 100 hectares (all for 1882) turned out to be either insignificant in the explorative stage of the modelling, or to have been affected by multicollinearity, and were thus excluded from the above description.\textsuperscript{26}

\textsuperscript{26} It has also been shown that, contrary to many assumptions found in the literature, more severe forms of manorial systems linked with serfdom tended to loosen lineage ties and to enhance neolocality and nuclear household structure (Mitterauer 2003, ch. 3; Szołtysek 2008a).\textsuperscript{27}

\textsuperscript{27} To our knowledge, the living arrangements of the miners have never been explored nor discussed in the literature.
people, and the lower the age at marriage. This variable should also be associated with fewer marital units per household.

We used four crude indicators of regional “cultural” propensities. The share of Catholics in 1885 [SHCATH85] (SDRNF-32: 244f.) marks a minority population within the predominantly Protestant German Empire. The differing demographic effects of being either a Catholic or a Protestant are not easy to model (Sklar 1974, 236-237; also Goody 1983; Caldwell and Caldwell 1992, 59; McQuillan 1999, 48-52; Hörning 1998). We hypothesized that Catholic communities should have higher shares of unmarried people and later ages at marriage. We also tentatively assumed that Catholics should have fewer marital units per household than Protestants.

Our second measure of “cultural effects” is the share of the population that speaks Slavic languages [SHSL] (SDRV-11: III, 70-74). Following a conventional approach, we assumed that a higher share of Slavs in the population is associated with lower percentages of unmarried people, a lower age at marriage, and more marital units per household (Le Play 1982/1872, 259; Le Play 1877-79; Hajnal 1965; Coale and Treadway 1986, 48-52; see also Coale 1969, 12). A dummy variable was used to capture the possible effects of the differences between partible and impartible inheritance systems (DM_INH). Regions with partible inheritance should have lower percentages of unmarried people, a lower age at marriage, and fewer marital units per household (Berkner and Mendels 1978). In order to control for the effects of the legacy of marriage restrictions on celibacy rates, another dummy was used to indicate areas where marriage restrictions (DM_MAR) were in force in the first half of the 19th century (Knodel 1967). These restrictions were lifted throughout Germany in 1866, but might still have had an effect on the marital behavior of some cohorts in 1885.

Finally, we introduced one variable containing information on the latitude value of the region’s centroid [LAT], and another one containing information on the longitude value [LON]. This allows us to determine whether an east-west or a north-south pattern in the model remains or arises after controlling for important covariates.

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28 On the difficulties in operationalizing cultural variables in quantitative research, see Hammel 1990; Fricke 1997.
29 Unfortunately, data on the Slavic-speaking population is not available for 1885 or for any earlier period. For the Prussian Regierungsbezirke and Kreise we used values from 1890, while for the other 48 regions of the German Reich, we had to rely upon values for 1900. The latter is not problematic, as through the period most of the Slavic population lived in Prussia. Outside of Prussia, the maximum value is 0.63% in Saxony; 41 of the 48 regions have values of less than 0.05%. Within Prussia, the only regios that might have experienced substantial change between 1885 and 1890 is the eastern part of the Ruhr area, where some districts experienced substantial in-migration of Slavic people from the east. However, the Regierungsbezirke in this area (Arnsberg and Münster) had a share of Slavs of 1.58% or 1.07% in 1890. Even if the percentage had been zero in 1885, this would have no great effect on the model, as values in the eastern part of the German Reich varied between 15% and 65%.
30 We use a dummy variable for regions with a predominantly partible inheritance pattern. This information is based on a map showing the regional distribution of inheritance patterns (Huppertz 1939, map 1).
Our application of structural multivariate linear models consists of two model specifications for three dependent variables. In the first specification, only those covariates considered in the literature that turned out to be good explanatory variables were included. In the second specification, we used all those variables that are based on theoretical considerations, and all explorative findings we believed to have had an impact on the variable of interest (the “full model”). Because we modeled with geographic units, it is possible that our estimates are distorted by spatial autocorrelation/spatial heterogeneity problems (see Anselin 1988). Thus we applied tests of spatial autocorrelation on the residuals of the models.

The model results are displayed in TABLE 3. The theoretical model for MUH has a rather small adj. R-squared of 0.33, whereas the Moran’s I test suggests that positive spatial autocorrelation is indeed a problem. Three out of four significant variables exhibit the expected signs (share of the agricultural population, share of widowed/divorced, and share of Catholics). For the variable population aged 65 and above, however, the model returns an unexpectedly large negative estimate.

In our second full model we included 11 variables. Of the four significant covariates (share of widowed/divorced, mean household size, average farm size, share of Catholics), all exhibit the right sign. The share of Slavs is significant at the 0.1 level, also has the right sign. However, the residuals of our model exhibit even higher positive spatial autocorrelation than for model 1, as can be seen from the Moran’s I test statistics. The finding that the share of the agricultural population is not significant in the full model is contrary to the findings of Ruggles (2009). However, this might be caused by multicollinearity with the measure of household size.

To check the extent to which our models for MUH might be biased due to the use of data for large regional conglomerates (German Regierungsbezirke), we calculated a set of alternative models using Prussian data alone, one with Regierungsbezirk data (models 7 and 8), and one with district

To test for the effects of spatial autocorrelation, we calculated a Moran’s I test on the dependent variables and on the residuals of the model (see Anselin 1988). With regard to the residuals, we were also interested in whether an east-west-gradient among the residuals remains, or appears after controlling for important covariates. We first calculated the Moran’s I index for the dependent variables. For marital units per household, the index is 0.33***, and the respective values for the singulate mean age at marriage of females and the percentage of celibate females are 0.45*** and 0.62*** (The calculations were based on a first order queen neighborhood definition, where all regions j that share a common border or vertex with a region i are considered neighbors of region i). This indicates that positive spatial autocorrelation is likely to cause problems in the modeling.

A related problem is that we can identify very unusual subregions inside the German Empire, both socioeconomically and culturally (e.g., Eastelbia, as well as southern Germany). This increases the risk that we could introduce a variable in the model that has little to do with the process of interest, but is significantly related with the dependent variable, simply because the values of this covariate correspond with those of the dependent variable in the big subregions of the country.

The estimate for the latter variable suggests that historical patterns of coresidence generally do not support the traditional view among demographers that Catholics have more “familistic” attitudes due to a lower degree of individualization.
data (models 9-10) (TABLE 4) (Galloway et al. 1994)\textsuperscript{33}. Among the covariates, we expect variables on population density, urbanization rates, share of workers in mining, and share of Slavs to exhibit particularly high degrees of heterogeneity at the district level, which is likely to be hidden if the Regierungsbezirk level is used.

In general, it is striking that the overall model results are very similar, including the way the estimates change after the introduction of the variable mean household size. In both models, the dummy Eastelbia changes its sign, suggesting multicollinearity problems. Moreover, the estimated R-squared values and some estimated effects are very similar, including the effect sizes of the share of Catholics, the mean household size, or the population aged 65 (or 70) and above. In addition to the above-mentioned similarities, there are also some differences. For example, the estimates on population density, the share of Slavs, and the share of workers in mining are significantly associated with MUH in the district-level model. This supports our assumption that the effects of these variables might be underestimated if we use more aggregated data. In general, the district model seems to be less sensitive to the inclusion and addition of variables. The similarities between the models lend support to the assumption that it is possible to construct meaningful models at the Regierungsbezirk level.

In the theoretical model of singulate mean age of marriage (mod. 3 in TABLE 3), seven variables turned out to be significantly associated with the dependent variable. However, only the shares of day-laborers, Catholics, and Slavs exhibit the right sign, while the dummy of Eastelbia unexpectedly has a positive sign\textsuperscript{34}. The R-squared of this model is, at 0.4, fairly low, and might even be overestimated due to spatial autocorrelation.

The fourth model has similar problems. Of the six significant variables, only the share of day-laborers, the dummy for the inheritance pattern, the share of workers in mining, and the share of Slavs have the expected signs. The two variables for which the estimates are not in line with our expectations are the share of Catholics and, again, the dummy Eastelbia. After day-laborers are excluded, the share of Catholics turns to the expected sign, and becomes significant. However, the dummy Eastelbia retains the unexpectedly significant positive sign. The R-squared value is low (0.45), and spatial autocorrelation is again at stake.

\textsuperscript{33} Unfortunately, with regard to the covariates, the district level dataset does not provide data on all variables of interest. In the first two models of each set, we include all variables except the mean household size, which is highly associated with MUH, but might suffer from endogeneity problems. The second model is then the full model with all variables available in both datasets. For the Prussian data, we had to use the proportion of people aged 70 and above (instead of 65 and above).

\textsuperscript{34} This is probably another case for a multicollinearity problem. If we exclude day laborers, the dummy Eastelbia becomes insignificant.
Model 5 (TABLE 3) displays the initial results for the share of single females aged 45-49. Of the eight covariates, only two are significantly related to the dependent variable (the share of Catholics and the share of Slavs). The adjusted R-squared is at 0.65, but might be influenced by positive spatial autocorrelation, as the Moran’s I is positive and significant. In the full model (Mod. 6 in TABLE 3), the Moran’s I index value is close to the significance level. Of the eight variables, four become significant, but one exhibits an unexpected sign. The covariates with the expected sign are the share of Catholics, the share of Slavs, and the share of workers in mining. The variable that is significant and that has the wrong sign is the average farm size, which is negatively associated with the dependent variable.

**DISCUSSION**

Of the three variables, the one that best fits our explanatory modeling is the share single females aged 45-49. In addition, a rather good model can be constructed for marital units per household, particularly if we include demographic variables such as the share of widowed/divorced people or the mean household size. The results of the district-level model suggest that, at a smaller scale, population density, share of Slavs, and the share of workers in mining are good predictors of household complexity. For SMAM, our modeling results are not as good as for the other variables.

Cultural covariates seem to be very useful in explaining nuptiality patterns, particularly the degree to which marriage is universal. With regard to household complexity, cultural measures, such as the share of Slavs, seem to matter less. The latter’s effect can only be captured at a lower scale of aggregation, but even then, demographic indicators—such as the share of divorced/widowed people or the mean household size—are more closely associated with the dependent variable. Of the economic measures, the share of the population in mining also seems to have an effect on marital behavior by lowering the age at marriage and decreasing the number of women ever married. However, a positive relationship with the number of marital units per household can only be observed with district data. Covariates related to the agricultural structure are only of limited value according to our modeling results. Only in the model on SMAM are a number of measures highly significant relative to the dependent variable, and exhibit the right sign.

It should be noted, however, that the variations in the patterns of coresidence observed in Germany in 1885 seem to be smaller than in other European areas of that time or before, including in France (Parish and Schwartz 1972; Le Bras 1995), Italy (Barbagli 1991), the Iberian Peninsula (Rowland 2002), or historical Poland-Lithuania (Szoltysek 2008a, 2008b). Looking at within-country variation provides certain insights into the differences in family organization in different regions in the mid-1880s. However, compared to a country’s spatial heterogeneity, the degree of
variation between regions in the onset and speed of the first demographic transition, as well as on other standardized measures of demographic developments, appears to be small (Knodel 1974; also Watkins 1991, 26, 33-34). The relative uniformity of the German coresidence patterns in 1885 is also surprising because of the country’s social, economic, and cultural diversity.

In her book, “From Provinces into Nations,” Watkins (1991) suggested that a widespread pattern of demographic convergence within state boundaries was taking place between 1870 and 1960 among the provinces of Europe. She related this spread of “demographic nationalism” to the increasing integration of national markets, the expansion of state functions, and the decrease in linguistic diversity, which, by fostering greater social integration, also facilitated greater uniformity in individual demographic behaviors across the entire nation. Is it plausible to interpret our findings about the small degree of within-country variation in coresidence as an effect of the processes described by Watkins?

Germany was a patchwork of regional political entities until the founding of the German Empire in 1871. This means that, in 1885, unified Germany had only existed for a short period of time, which tends to cast doubt on the hypothesis that the small degree of within-country variation could be an effect of demographic nationalism.

To further investigate this issue, we used published aggregate data to construct sequential cross-sectional measures of MUH for larger administrative-political units within historical Germany (TABLE 5). Parameters for the Prussian provinces over the last three censuses are almost identical (all measures of dispersion are nearly the same), and show no signs of increased variegation or of homogenization. However, the data for 1867 had higher dispersion, and point to somewhat greater heterogeneity within the Kingdom (increase in the standard deviation of less than .03 units). This was primarily caused by much lower values of the MUH index for two provinces (Brandenburg and Hessen-Nassau), features which disappeared in subsequent censuses.

As it relates to household coresidence, Watkins’ hypothesis could also be rejected in our case after we inspected Galloway’s lower-scale Prussian data (Galloway’s et al. 1994). We found that, between 1871 and 1905, among the time-constant 407 districts, the standard deviation did not decrease, but rather increased from 5.91 to 6.31; while the mean changed only slightly, from 108.03 to 108.37. It seems that, contrary to the traditional notion of “Parsonian” family sociology, the beginning of the great demographic revolution in Germany was associated with variegation, rather than with homogenization of family composition.

35 Note, however, that this time the unit of analysis is even larger than in our original exercise, due to aggregation of Regierungsbezirken into “provinces”. However, Watkins used exactly the latter unit of observation in her analysis.
CONCLUSIONS

In this paper, we investigated the possible existence of different family systems across Germany in 1885. For our study, we used aggregate measures of household complexity in conjunction with measures of nuptiality. Several clusters with different incidence rates of marital units per domestic group existed in the German Empire at the time, with higher proportions of households with more than one marital unit found in the north, and lower proportions found in the south of the country. Patterned clustering was also observed for the age at marriage and the percentage of never-married people.

We suggest the division of late 19th-century Germany into two main regions with different family systems. Relatively higher household complexity, low female age at marriage, and low proportions of celibate women were the typical features of the system in the center and in the east. Meanwhile, the areas in the west and south were characterized by low rates of coresidence, high ages at marriage for women, and high proportions of women in permanent celibacy. These findings suggest that the east-west distinction (the famous Hajnal line) cannot be proved within Germany. The country’s position on the western side of this divide is confirmed by the high age at marriage, the high proportion of permanently unmarried people, and the low number of marital units per household. The south-north divide turns out to be more important than the east-west divide within the country.

Contrary to our expectations, many of the supposedly decisive cultural and socioeconomic borders within late 19th-century Germany do not appear to have corresponded with these spatial patterns of family composition. The pattern of land ownership and agricultural organization known as the manorial system east of the river Elbe had some influence on household and marriage patterns in Germany, but it was significant only for the age at marriage. The two major regions within Germany revealed by the cluster analysis coincide only partly with the dividing line of the river Elbe. A major part of northwestern Germany displayed the same patterns as a major part of Germany east of the river Elbe. Meanwhile, some other parts of Eastelbia presented a different pattern. The proportion of the population in agriculture had no influence on household and marriage patterns in Germany in 1885. The influence of inheritance patterns on family structure seemed to have been smaller than is often assumed in the literature, largely because most, but not all, of the partible inheritance regions belonged to one pattern.

Thus, this research suggests that simple explanations may not be sufficient in accounting for the reasons behind the spatial organization of family systems in historical Germany. To properly understand the geography of historical family systems, it is essential to consider the intrinsically
complex interplay of economic, demographic, and cultural factors; which are, in turn, further differentiated by local and environmental contexts, and by historical path dependencies. This research can serve as a starting point for more contextual and place-specific future investigations.

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FIGURES, TABLES and MAPS

FIGURE 1: Indexes of Marital Units per Household and Adults per Household, 83 Regierungsbezirke of the German Empire 1885

![Figure 1](image1.png)

Source: SDRNF-32: Die Volkszählung im Deutschen Reich am 1. Dezember 1885

FIGURE 2: Index of marital units per household and proportions of complex households, 79 parishes from the western territory of the Kingdom of Poland, late 18th century

![Figure 2](image2.png)

Source: M. Szoltysek, CEUFAMFORM Database
FIGURE 3: Spatial Trend Plots, 83 Regierungsbezirke of the German Empire 1885.

Source: German Reich Statistical Office; HGIS Germany
FIGURE 4: Spatial Variation in the Dependent Variables – Results of the Cluster Analysis

a) Marital Units per Household (Regierungsbezirke) 1885

b) Singulate mean age at marriage for females (Regierungsbezirke) 1885

c) Percentage never married Females aged 45-49 (Regierungsbezirke) 1885

d) Marital Units per Household (Prussian regions at district level) 1885

e) Hierarchical clustering for MUH, SMAMF and SHS4549F (Regierungsbezirke) 1885 (Ward’s minimum variance method)
### TABLE 1: Hierarchical clustering for MUH, SMAMF and SHS4449F 1885 (83 Regierungsbezirke of the German Empire)

<table>
<thead>
<tr>
<th>Clusters (C)</th>
<th>Household complexity Intensity*</th>
<th>MUH Value</th>
<th>Age at marriage Intensity*</th>
<th>SMAMF Value</th>
<th>Celibacy Intensity*</th>
<th>SHS4449F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>very high</td>
<td>113.65</td>
<td>low</td>
<td>25.40</td>
<td>low</td>
<td>8.65</td>
</tr>
<tr>
<td>2</td>
<td>very low</td>
<td>103.33</td>
<td>very high</td>
<td>26.33</td>
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<td>24.36</td>
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* These are relative, not absolute terms.

### TABLE 2: Dependent and independent variables – descriptive statistics

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<th>Standard Deviation</th>
<th>N</th>
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<td>4.61</td>
<td>83</td>
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<td>3.88</td>
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<td>33.00</td>
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### TABLE 3: Model Estimates: 83 Regierungsbezirke of the German Empire 1885

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<th>VARIABLES</th>
<th>MOD. 1 MUH (Theo.)</th>
<th>MOD. 2 MUH (Full)</th>
<th>MOD. 3 SMAM (Theo.)</th>
<th>MOD. 4 SMAM (Full)</th>
<th>MOD. 5 SHSF 44-49 (Theo.)</th>
<th>MOD. 6 SHSF 44-49 (Full)</th>
<th><strong>β</strong></th>
<th><strong>β</strong></th>
<th><strong>β</strong></th>
<th><strong>β</strong></th>
<th><strong>β</strong></th>
<th><strong>β</strong></th>
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<td>*</td>
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<tr>
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<td>Share Servants</td>
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Significance codes: 0 *** 0.001 ** 0.01 * 0.05

Source: German Reich Statistical Office; Own calculations
**TABLE 4: Model Estimates: German *Regierungsbezirke* and Prussian *Kreise* compared (1885)**

<table>
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<tr>
<th>VARIABLES</th>
<th>GERMAN REGIERUNGS-BEZIRKE</th>
<th>PRUSSIAN KREISE (DISTRICTS)</th>
<th>VARIABLES</th>
<th>PRUSSIAN KREISE (DISTRICTS)</th>
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<td>PRUSSIAN</td>
<td>MOD. 9</td>
<td>MOD. 10</td>
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<td>MUH (without MHS)</td>
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<td>Pop. in Local. &lt; 2000 inh.</td>
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<td>Pop. in Local. &lt; 2000 inh.</td>
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<td>Share Pop. &gt; 65 y. 1882</td>
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<td>Share Pop. &gt; 70 y. 1890</td>
<td>β -1.85</td>
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<tr>
<td>Share Widowed/Divorced</td>
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<td>β 3.62</td>
<td>Share Widowed/Divorced</td>
<td>β -0.74</td>
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<tr>
<td>Mean Household Size</td>
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<td>Mean Household Size</td>
<td>β 13.36</td>
</tr>
<tr>
<td>Dummy Pred. Part. Inherit.</td>
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<td>Dummy Pred. Part. Inherit.</td>
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<td>Share Empl. in Mining</td>
<td>β 0.09</td>
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<tr>
<td>Share Catholic</td>
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<td>Share Catholic</td>
<td>β -0.08</td>
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<td>Share Slavic (1890)</td>
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<td>β 0.07</td>
<td>Share Slavic (1890/1900)</td>
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<td>Moran’s (First Order Queen)</td>
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Significance codes: 0 *** 0.001 ** 0.01 * 0.05

Source: German Reich Statistical Office; Galloway et. al. 1994; Own calculations
TABLE 5: Marital Units per Household for Prussian Provinces, 1861-1890

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<th>PROVINCE</th>
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Source (1861, 1867, 1880 and 1890): Rothenbacher 1997