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A Cliometric View

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Abstract

This survey considers the use of church book data to investigate topics in economic history. It exploits the Malthusian population model to cast light on ongoing scholarly debates about the Little and Great Divergences and the rise of the wealth of nations, illustrating some key advantages (and drawbacks) to using church book registry in this context.

JEL codes C8, N3, O1

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Introduction

Church book registers normally provide data regarding three main life events: births, deaths, and marriages. These events tended to vary strongly in the past with wages and prices. For example, the likelihood of a marriage or a childbirth usually increased with wages, just as a death or a miscarriage increased with the price of food. Equally, births and deaths together determine the size of the population, which in turn impacted on wages and prices through people's supply of labor and demand for food. The interaction between economics and demography in the past is thus of interest to economic historians, and church book registry provides an important source of information for studying the relationship between the two.

Economic historians and historical demographers often use the so-called *Malthusian population model* for understanding how the two factors might be interrelated. After a brief introduction to the Malthusian framework, the Chapter then turns to discussing the nature of church book registers, and how these have been used to push the research frontier in recent scholarly debates.

The Malthusian Model

The popularity of the Malthusian model in economic history arise from the widespread idea that all historical societies were characterized by *Malthusian population dynamics* (e.g. Clark 2007). These dynamics are illustrated in Fig. 1, capturing the links between economics and demography outlined above. In particular, Malthus hypothesized that changes in wages exercised a dual effect on the growth of a population (Malthus 1789). On the one hand, higher wages would cause more marriages, leading therefore to more births. This so-called *preventive check* mechanism is captured by the upward-sloping birth schedule in Fig. 1. Higher wages simultaneously reduce death rates, capturing the so-called *positive check* mechanism illustrated by the downward-sloping death schedule in Fig. 1. The intersection point between the birth and the death schedules then determines the equilibrium wage rate, defined as the wage rate that keeps the size of population constant over time.

Birth b(w)/ death d(w)

b(w)

Population shrinks (b<d)

Population grows (b>d)

d(w)

Equilibrium wage

Real Wage (w)
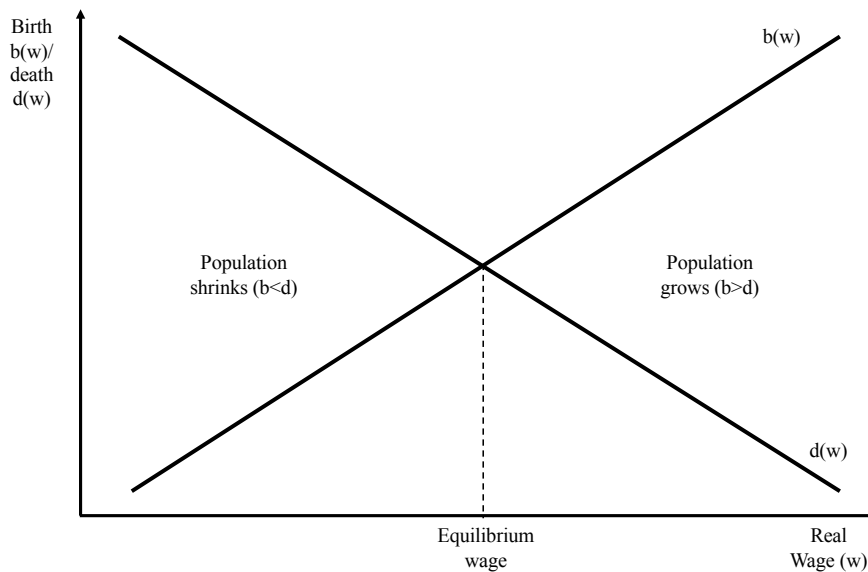
Fig. 1: The Malthusian model

The dynamics of the Malthusian model are completed by the addition of an element that links population size to wages. In particular, Ricardo noticed that population growth, through an increased labor force, drives down the marginal product of labor in the absence of technological progress (Ricardo 1817). This feature usually builds on two assumptions concerning production technology: constant returns to scale and a fixed factor of production, normally land. Ricardo's assumptions, together with Malthus' preventive and positive checks, secures that the economy always returns to its equilibrium wage rate in the absence of new technology. For example, if wages for some reason rise above the equilibrium wage rate causing births to exceed deaths (see Fig. 1), then the population level starts to grow. This leads the marginal product of labor – and hence the wage rate – to decline. Lower wages causes fewer births and more deaths until the wage rate eventually returns to its equilibrium level, and population growth comes to a halt. The same dynamics apply if wages drop below the equilibrium, *mutatis mutandis*.

The Malthusian model provides a helpful framework to understand why some historical societies were rich and others poor. That is, a deviation in the equilibrium wage rates between two societies must be grounded in different structural arrangement causing the positions of the birth and death schedules to differ. Within this context, the underlying question often asked by scholars concerned with these topics are the following: what are the short- and long-term effects of shocks to the Malthusian system, and how might these shocks consolidate themselves in permanent shifts in the positions of the birth and death schedules? The answers can cast light on several unresolved debates in economic history, and church book registry is an excellent tool to achieve such insights.

Some Key Debates in Economic History

One such debate concerns the Little Divergence within Europe. Why did England and the Low Countries pull away from the rest of Europe between 1500 and 1800 in terms of real wages? Robert Allen's so-called *welfare ratios*, which measure the number of (prefixed) consumption baskets that a representative family can afford given their earning possibilities (Allen 2001), are a great illustration of this (Fig. 2).
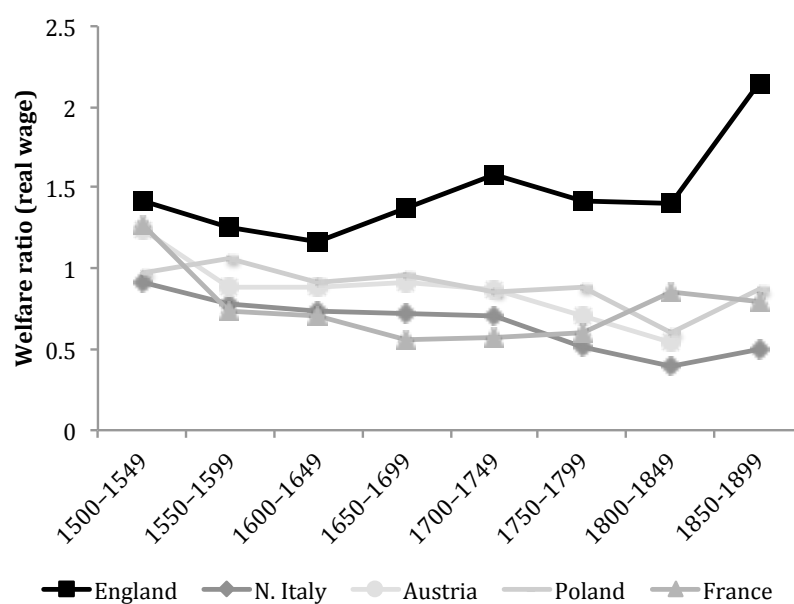
Fig. 2 The Little Divergence within Europe (Source: Allen 2001)

A temporary divergence in real wages can, of course, be viewed as a disequilibrium episode. That is, any shock that pushes the Malthusian system out of its equilibrium will ignite the dynamics described above and ensure a return to the system's equilibrium, with real wages back to their original level. The Black Death, a huge and sudden decline in Europe's population in the mid-fourteenth century, is a possible example of this: fewer people raises the demand for labor, wages rise, and birth exceed deaths. The population then starts to grow, and the marginal product gradually declines again until the population and wages are both back at their equilibrium levels.

This temporary disequilibrium view, however, does not necessarily offer the full picture. As the population level gradually re-stabilized in the centuries following the Black Death, most European wages fell back to their pre-Black-Death level. But in England and the Low

Countries they did not. This leaves the question: did the Black Death do more than just push the system out of its equilibrium temporarily? Did the episode entail a structural transformation that shifted the birth or death schedules, ultimately escalating the equilibrium wage level in England and the Low Countries?

There are multiple candidates for a structural change to the system as a result of the plague. Examples of this are offered in De Moor and van Zanden (2010) and Voigtländer and Voth (2013a), two studies that both link the economic superiority of Northwestern European economies after 1500 to the legacy of the Black Death. The argument made, which runs from the influence of women's remuneration on the timing of their marriage, is inspired by John Hajnal's hypothesis about the *European Marriage Pattern*. Hajnal (1965) noticed that for much of the medieval and early modern period, a line drawn from St. Petersburg to Trieste demarcated distinctive demographic regimes: in the east, women married young and almost everybody are married; in the west, brides were older and celibacy was higher.

De Moor and van Zanden and Voigtländer and Voth have interpreted Hajnal's two scenarios in terms of differences in the economic opportunities of women. Women's improved position in the post-plague labor market, especially the growth of opportunities as servants in husbandry linked to the relative expansion of "horn" (in which women had a comparative advantage) versus "grain" (in which they did not), allegedly pushed up female wages and their labor force participation. Since women, unlike men, split their time between raising children and working, improved wages and labor opportunities for women place a premium on child birth, causing delayed marriage and increased celibacy, both resulting in reduced fertility. In terms of Fig. 1, the rising premium on childbirth would shift the Malthusian birth schedule downward inaugurating Hajnal's European Marriage Pattern. As an indirect consequence of the Black Death, Northwest Europeans therefore found themselves in a new steady state with greater female employment, later marriage, lower fertility, and higher per capita incomes (Voigtländer and Voth 2013a).

Other hypotheses have been forwarded to try to motive Northwest Europe's economic superiority through shifts in the birth or death schedules in Fig. 1. De Vries's (2008) idea that a *consumer revolution* preceded the Industrial Revolution provides an alternative approach to understanding the rise of a premium on children and hence a downward shift in the position of the birth schedule in Fig. 1. The consumer revolution refers to the introduction of novel commodities (tea, coffee, sugar, books, clocks, etc.) between 1600 and 1750. The argument made, then, is that households have *love- of-variety* preferences and hence accommodate the novel commodities in their consumption basket by allocating *less*

resources to the goods they already consume. Since children, or the goods that children consume, are among the goods already consumed, the demand for these goods, and hence the demand for children, declines. The consumer revolution thus shifted the birth schedule downward, causing a new equilibrium with fewer births and deaths and a higher level of wages (Guzman and Weisdorf 2010).

Technical progress offers a third explanation for why the cost of children went up, pushing the birth schedule down. Galor (2011) hypothesizes that the complexity of new and more advanced jobs that industrialization entailed placed a premium on education. This incited parents to increase the investment in the human capital of their offspring, powered by a decline in their number of births. The increased cost per child would mean the birth schedule shifted downward, generating a new equilibrium of fewer births and fewer deaths but higher real wages. Still others, such as Clark (2007), have used the Malthusian framework to highlight the "benign" effect of fatality on wages. Indeed, anything that pushes the death schedule of Fig. 1 upward will cause the equilibrium wage rate to permanently rise. Voigtländer and Voth (2013b) have use this point to draw a link between European wars and high rates of urbanization to explain Europe's economic prosperity vis-à-vis that of other world continents.

Common to all these (mostly theoretical) accounts of what explains episodes of divergence – both within Europe (the Little Divergence) and between Europe and other continents (the Great Divergence) – is a lack of empirical depth. This is where church book records can bring news to the table. The next section gives an illustration of the nature of the crucial information concealed in church books, followed in the subsequent section by a series of examples of how previous studies have used church recordings to cast light on some of the main research questions surrounding the debates about the Little and Great Divergences and the rise of the wealth of nations. The chapter concludes by pointing toward some future research roads building on source material derived from church book registers.

The Nature of Church Book Registers

Early civil registration in Europe was usually done by the church on request from the crown. From the mid-nineteenth century on, civil registration was gradually taken over by secular institutions. Systematic census registrations, often first done every 5 or 10 years but later annually, were slowly replaced by a central authority gathering vital information as it appeared. The information recorded in the population censuses and later the central registers

is obviously superior to that of church book records, partially because they include the entire population regardless of religious affiliation and partially because census data provides a spot image of the entire population and not just those reporting a vital event to the church in a given year.

The main advantage of the church book registry (also known as parish registry) is that these provide large-scale vital information before 1800, i.e., the period during which the Little Divergence began to take hold. Although the church book registry only captures people during three life events – birth, death, and marriage – it is nevertheless able to inform us about some key links between economics and demography, and vice versa, as we shall see below.

In the Old World, church registers became widespread in the late middle ages and early modern period. In the New World, notably in many of today's developing countries, vital registration began with the arrival of European missionaries after the mid-nineteenth century, a practice that has continued up until the present day. Although church book registers appeared much later in the New World than in the Old World, the fact that central registers emerged relatively late in many developing countries (often not until the 1960s or even later) makes church book registry of the New World a particularly interesting source of vital statistics during the late nineteenth and early twentieth centuries.

Perhaps the most prominent dataset building on church book registrations, and probably the one most frequently subjected to scholarly scrutiny by economists and economic historians in the past several decades, is the so-called CAMPOP data (Wrigley and Schofield 1981), collected by the *Cambridge Group for the History of Population and Social Structure* founded in the 1960s by Peter Laslett and Tony Wrigley. The Group's work on collecting, transcribing, and analyzing English church book information, an effort spanning nearly five decades, has been used for three main purposes.

The first purpose is population *back projection*. By starting with the population level of the English census of 1831, and then counting the annual number of births and deaths recorded in 404 well-documented English parish registers, the Group was able to come up with a crude estimate of the size of the English population back to c. 1541 when church registration first began. The second purpose is *family reconstitution*. This builds on the simple idea, originally developed by French demographer Louis Henry, that vital events can be used to track the marriage date of a married couple, as well as the birth and death dates of their parents and their offspring, hence reconstructing an entire family tree based on church book statistics.

The third and last purpose of the Group's work, which is still ongoing, is a reconstruction of the occupational structure of Britain based on the (primarily) male occupations recorded in the church books. The three main purposes outlined above are discussed in more detail below.

One of the key advantages of church book registers is the information it provides *in addition* to the dates of the vital events. The details of the recorded statistics depend, of course, on the recording policies of the church in question. True of both the Protestant and Catholic churches, the recording of a birth (or baptism) would usually include the names of the parents as well as the time and place of the child's baptism. A marriage record would hold the names of the spouses, their civil status before the marriage, and the time and the place of marriage. This is occasionally supplemented by the names of the fathers of the spouses, as well as those of (usually two) witnesses. Lastly, a death (or burial) would contain the name of the deceased person and the date and place of the burial.

An important notice concerning the dates is that church books normally record the dates of baptisms and burials rather than the dates of births and deaths. However, the time intervals between the ecclesiastical and the vital events were usually rather short. For obvious reasons, people were buried immediately after they passed, in England typically within 3 days of death (Schofield 1970). Furthermore, English children were usually baptized within 1 month of birth (Midi Berry and Schofield 1971), although this could vary somewhat depending on local traditions and the distance from the family home to the church.

Also true of most Christian churches is that they would ask the parents or spouses (as well as fathers and witnesses) to certify and endorse the event in question by placing their signature in the church book. This practice has served as an important measure of a population's literacy skills in past societies. When someone was unable to sign their name, the vicar would write their name instead, and the illiterate person was simply asked to leave a mark in its place to prove his or her consent. While it is obvious that people who are able to write down their name are not necessary completely literate, a signature has proven to be a reasonable proxy for the ability to read and write (Schofeld 1973).

Sometimes the church registers hold even more profound information about someone's human capital attainments than an indication of their literacy status. Some churches, during certain time periods, also recorded the occupational title of the individuals involved in the registration of the vital event (see Buckatzsch 1949). This is often (though not always) the case in Protestant church registers, a practice that, for Anglican Protestants especially, was

made compulsory by the passing of Rose's Law in 1812. The law specifically asked the ministers to record the occupational title of parents, spouses, and fathers-in-law (and sometimes even the witnesses).

The recording of someone's profession provides a critical insight into the socioeconomic conditions of that person, including his or her social status, working skills, and income potential. Occupational information would sometimes even include individual land holdings, providing further knowledge about social status and wealth of the person in question.

There are several ways in which occupational information can be coded and thus made subject to systematic studies of the links between demographic variables and socioeconomic conditions at the individual level. Starting with one of the broader systems for categorizing professions, the *Primary- Secondary-Tertiary* (PST) system developed by Sir Anthony Wrigley of the Cambridge Group (Wrigley 2010), has been used to code the entire occupational dataset collected from British church books in order to study the occupational structure of Britain since medieval times (e.g. Shaw-Taylor and Wrigley 2014). The great advantage of the system is its classification of all occupations depending on whether the work related to primary, secondary, or tertiary sector activities. A main downside to this system, however, which the Group is still struggling to solve (ibid.), is the problem of categorizing the occupation title "laborer," which was not only a very common occupational title but also one that does not reveal the nature (or sector) of the work conducted.

Another classification system, which is comparable as well as compatible to the PST system, is the *Historical International Standard Classification of Occupations* (HISCO), developed by Marco van Leeuwen, Ineke Mass, and Andrew Miles and documented in Van Leeuwen et al. (2002). This HISCO is an extension of ISCO (International Standard Classification of Occupations) for which the International Labour Organization (ILO) is responsible. The HISCO contains 1,675 historical job categories. The world coverage of the HISCO, along with its time range (spanning the sixteenth to twentieth centuries), allows a categorization of occupational titles from almost any historical population worldwide in which historical occupational records exist.

In a subsequent book, *HISCLASS*: *A historical international social class scheme*, labor historians have ranked all the occupations coded in HISCO based on an assessment of the working skills required for an average performance on the job (van Leeuwen and Maas 2011). The ranking of occupational titles builds on the principles of the *Dictionary of Occupational Titles* (DOT). The DOT was developed in the 1930s by the US Employment Service in

response to a rising demand for standardized occupational information to assist job-placement activities (US Department of Labor 1939). In order to efficiently match jobs and workers, the public employment service system required that a uniform occupational language be used in all of its local job service offices. Through an extensive occupational research program, occupational analysts collected and provided data to job-market interviewers to help them match the specifications given in job openings to the qualifications of job applicants. Based on the data collected by occupational analysts, the first edition of the DOT was published in 1939, containing some 17,500 job definitions, presented alphabetically by title, with a coding arrangement for occupational classification.

The transformation in HISCLASS of occupational titles into working skills builds on two main scores used in the DOT: the *general educational development* score and the *specific vocational training* score. The score concerning the general educational development captures three key features regarding intellectual competencies necessary to fulfill the tasks and duties of an occupation: the incumbent's reasoning development, his or her ability to follow instructions, and the acquisition of language and mathematical skills needed to conduct the work. The score concerning specific vocational training captures the time investments needed in three main areas: that required by the worker to learn the techniques used on the job; that needed to acquire the relevant information to conduct the work; and that necessary to develop the competencies required for an average performance in a job-specific working situation.

Building on the expertise provided by Bouchard (1996) and a team of labor historians, van Leeuwen and Maas used the two DOT scores to code the occupational titles categorized in HISCO according to the skill content of the working titles contained in the HISCO, as part of a procedure to create a historical international social class scheme. In HISCLASS, occupational titles are grouped in four categories as either *unskilled*, *lower skilled*, *medium skilled*, or *higher skilled*. Ongoing work by van Leeuwen et al. (2014) is taking the skill categorization one step further, estimating the actual time investment needed to conduct the work that described the entire set of occupational titles contained in the HISCO system (van Leeuwen and Maas 2011). A further advantage of the HISCLASS scheme is its division of workers into blue-collar (manual) and white-collar (nonmanual) work.

Alan Armstrong's occupational classification scheme offers an alternative to using HISCLASS, splitting jobs into five class categories (Armstrong 1974): Professional, Intermediate Occupations, Skilled Occupations, Partly Skilled Occupations, and Unskilled Occupations. Both systems (HISCLASS and Armstrong's) are useful in their own rights

depending on the question at hand. A further advantage of the HISCO scheme, however, is its extension system called HISCAM, a scheme for coding occupations according to the social status of the work linked to the job title offering a finer categorization of *social* status than the HISCLASS (Lambert et al. 2013). The SOCPO, a competing scheme to the HISCAM, provides a similar coding of occupational titles into social class (Van De Putte and Miles 2005).

Social status and working skills are, of course, both imperfect approximations of individual income or wealth. Greg Clark and Neil Cummins' work, which uses will records to link wealth to professional titles, provides a mapping of occupations into seven social groups based on the wealth recorded in the wills, as described in Clark and Cummins (2015). From the poorest to the richest, these social groups are laborers, husbandmen, craftsmen, traders, farmers, merchants, and gentry. This classification is particularly helpful for looking at links between income potential and fertility decisions (discussed below).

Last but not least, the church book data truly comes to life when combined with other database information. So far, very little work has been done in this regard. Klemp et al. (2013) offer a demonstration of this, linking the CAMPOP data to statistics regarding apprenticeship (see further below). Other possibilities include combinations with census data, will records, probate inventories, poor law information, and tax records. Much work still needs to be done in this regard.

Coming back to family reconstitution data mentioned above, the huge advantage of this is the linkage of family members across family generations. This enables studies of intergenerational social mobility, marriage patterns, birth and death patterns, and much more. Although the work needed to reconstruct families based on the raw vital events can be quite laborious, the procedure is surprisingly simple. Start with a marriage. Then track the records back in time to find the birth date of the spouses (linking them to their parents) and possibly any previous marriage (indicated by the civil status at their current marriage). Go forward in time to find the death date of the spouses and, if the couple went to baptize (or bury) any children, to find the birth, marriage, and death dates of their offspring. It took several decades for the Cambridge Group to reconstitute the families within 26 English parishes (Wrigley et al. 1997). But this was before modern computer programming appeared that can aid this process significantly.

The work of reconstituting families based on church book data is complicated by the fact that people do not always remain in their parish of origin or indeed in a parish where they were once observed. The flipside to that problem is that the lack of someone's birth or death indicates they moved into or out of the parish in question, conveying important information about patterns of migration in the past (Souden 1984). A head-on way of dealing with the issue of lifecycle migration is by tracking down individuals as they move from place to place. The French so-called TRA data provide such statistics, tracking individuals whose names begin with "Tra" (as in "Travers," a common French family name) across time and space. Comparable datasets exist for other European countries as well.

Some scholars have raised criticism against the transformation of church book data into family reconstitutions. For example, perhaps the most prominent critiques of the work done by the Cambridge Group come from Peter Razzell (2007) and Steven Ruggles (1999). Much of their criticism is focused around under-registration, linkage failure, selection bias, and the consequences thereof. These potential shortcomings are worth keeping in mind when working with family reconstitutions.

How the Registers Have Been Used

There are numerous examples of how church registers have been used to analyze topics in economic history. Loschky (1967) offers some very early examples. This section focuses on some recent studies connected to ongoing debates regarding the Little and Great Divergences and the wealth of nations including how and why the development path of rich countries parted from that of poor countries.

The Malthusian framework described above has often served as a starting point for analyzing these questions. This scholarly work is split into two categories. One assesses the relevance of the Malthusian model and its two main components, the *positive check* and the *preventive check*, for different countries and regions. The other uses the implications of the Malthusian model to understand various aspects of the Little and Great Divergences and the wealth of nations. Church book data provide a key empirical basis for exploring both types of studies.

Probably the most prominent statistics used for these purposes (the CAMPOP data discussed in the previous section) are based on British parish registers. These data are made available by the Cambridge Group and described in Wrigley and Schofield 1981 and Wrigley et al. 1997. There are two main reasons for the popularity of the British data. One reason is that the

British parish registers are of very high quality and moreover cover three centuries of British population history, that is, from the origins of parish registration in 1541 until the main census registrations started to appear in the early nineteenth century. The other reason for their high esteem is that England was the world's economic leader between 1500 and 1800 and the first nation worldwide to experience an industrial revolution.

Many scholars believe that the centuries leading up to the industrial revolution were characterized by Malthusian population dynamics (e.g. Clark 2007). Tests of the relevance of the Malthusian framework using the British church registers span from relatively uncomplicated empirical investigations exploring the existence of short-term *preventive* or *positive check* mechanisms to highly advanced econometric examinations of the short- and long-term dynamics and stability of the entire Malthusian framework.

Despite a strong belief in the relevance of the Malthusian framework and its widespread use to understand the process of economic development in preindustrial societies, there is surprisingly little evidence in support of the preventive check hypothesis (e.g. Kelly and O Grada 2012). This has faced scholars with a large challenge, because the idea that falling living standards entail a short-term reduction in birth or marriage rates seems particularly appealing to the English case.[1] There is general agreement among scholars, however, that the Malthusian population model is correct and thus that the failure to obtain supporting evidence is due to issues of data and mismeasurement.

A key suspect for the lack of empirical support for the preventive check in England is data aggregation. One would ideally explore the direct link between the living standard of a particular couple and the demographic decisions (marriage or birth) made by the couple. But the scholarly reality is that living standards (captured by the levels of wages and prices) as well as vital rates (captured by marriage and birth rates) are often measured at the national level. This inaccuracy can be eliminated by moving from the macro to the micro level.

Kelly and O Grada (2012) have taken a first step in this direction, looking for preventive checks at the *parish* level. Instead of using the aggregated data of the 404 parish registers included in the CAMPOP file, they look at the parish-level response to changes in real wages. Even though the real wages are still at the national level, Kelly and O Grada are able to document the existence of preventive checks in many of the parishes included (but not all).

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[1] Some scholars have even found evidence of the opposite, documenting a positive relationship between nuptiality and the price of wheat, a phenomenon they coined permissive checks (Sharp and Weisdorf 2009).

An even closer inspection of the preventive check mechanism requires access to even more detailed vital accounts than aggregations at the parish level. This is where the CAMPOP's family reconstitution data discussed above prove useful. While many studies have relied entirely on the use of *crude* vital rates, meaning the number of birth, death, and marriages per 1,000 population, it is clear that these rates are only a rough approximation for family-level decision variables, such as the timing of a marriage and a birth.

Cinnirella et al. (2017, 2019) have used the CAMPOP's family reconstitution data to try to measure the effect of real wages and food prices on the timing of the marriage, the timing of the first birth, the timing of subsequent births, and the timing of the last birth. They find evidence of a strong *preventive check* mechanism operating in England in the three centuries leading up to England's fertility decline of the nineteenth century. Panel A of Figure 3 illustrates how birth-spacing intervals tend to shrink with rising real wages. Panel B shows how the spacing of births decline with household earnings proxied by the husband's occupation. Although the wages and prices used to measure standards of living are still at the national level (and certainly never at the family level), the church book recordings of the occupational titles of the husbands help control for the exposure (or lack thereof) to economic pressure during economic downturns. Studies similar to that of Cinnirella et al. has been done for Sweden (Bengtsson and Dribe 2006) and Germany (Dribe and Scalone 2010), also showing evidence of deliberate within-marriage birth-spacing behavior.

The CAMPOP family reconstitution data have also been employed in studies considering the relevance of the so-called male breadwinner model. Males, in the form of husbands, are traditionally assumed to have been the only provider of income in historical families. Recent work by Horrell et al. (2020, 2021a, 2021b) however have considered the contribution of women and children to family earnings. These exercises have informed about the importance of relaxing the male-breadwinner assumption for a better understanding of how household-level demographic decisions react to changes not just in male wages but also the wages of women and children. For example, by linking birth rates to male and female wages, respectively, Horrell et al. (2020) found that higher male wages result in *higher* birth rates, whereas higher female wages conversely result in *lower* birth rates. On the basis of observations of the development of household sizes inferred from the family reconstitution data, Horrell et al (2021a) were able to predict the life-cycle income requirements of both complete and disrupted families, including families where the husband was missing or unable or unwilling to work. Their study showed among other things when and among what family types child labor was needed during the early-modern period.
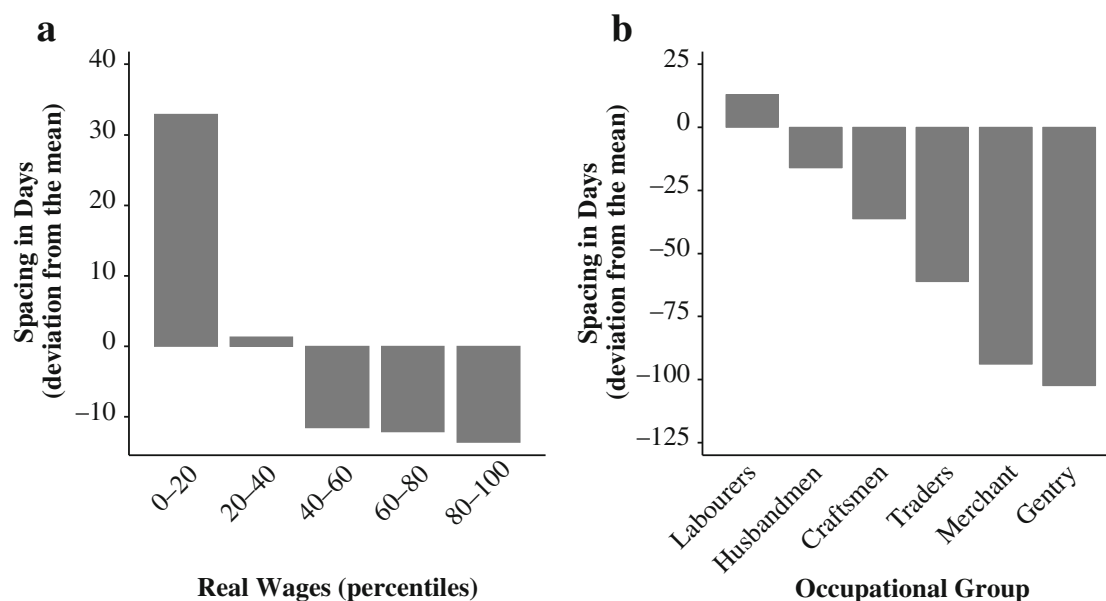
**Fig. 3** Birth-spacing intervals by real wage percentiles (Source: Cinnirella et al. 2017)

Among examples of more advanced (and holistic) approaches to testing the relevance of the Malthusian framework, Esteban Nicolini's original work, as well as follow-up work by Marc Klemp, Niels Frameroze Moeller, and Paul Sharp (cited below), deserves a mention. Common to these studies is the use of crude vital rates for birth, deaths, and marriages (notably of the CAMPOP data), which they then attempt to link up with historical living standards measured by (national) real wages, usually provided by Clark (2005).

In particular, Nicolini's (2007) work does not fit some crucial assumptions of the Malthusian model. Using a vector autoregression model for data on fertility, mortality, and real wages over the period 1541–1841 and applying a well-known identification strategy broadly used in macroeconomics, Nicolini's results show that endogenous adjustment of population to real wages functioned as Malthus assumed only up until the seventeenth century: evidence of *positive* checks then disappeared over the course of the seventeenth century and evidence of *preventive* checks disappeared before 1740. This implies that the endogenous adjustment of population levels to changes in real wages – one of the cornerstones of the Malthusian model – did not apply during the period of the Industrial Revolution.

Moeller and Sharp (2014) reexamined the question using data identical to those of Nicolini but with a somewhat different economic specification. They formulate a post-Malthusian hypothesis that on the one hand involves co-integration between real wages and the birth and death rates. But on the other hand, it allows a negative Ricardian feedback effect from population on income (as implied by diminishing returns to labor) to be offset by a positive

so-called *Boserupian-Smithian* scale effect of population on technology. This setup means they reach a different set of conclusions from Nicolini, namely, that, as early as two centuries preceding the Industrial Revolution, England had already escaped the pattern described by the standardized Malthusian model and instead had entered a post-Malthusian regime, where income per capita continued to spur population growth, but that the real wage was no longer stagnant. Tests of the relevance of the Malthusian (or post-Malthusian) framework are not confined to Britain. Klemp and Moeller (2016) have also experimented with church book data from Denmark, Norway, and Sweden, looking for evidence for the existence of a post-Malthusian phase in the transition from stagnation to growth in Scandinavia. Studies of other regions are currently in the making, too.
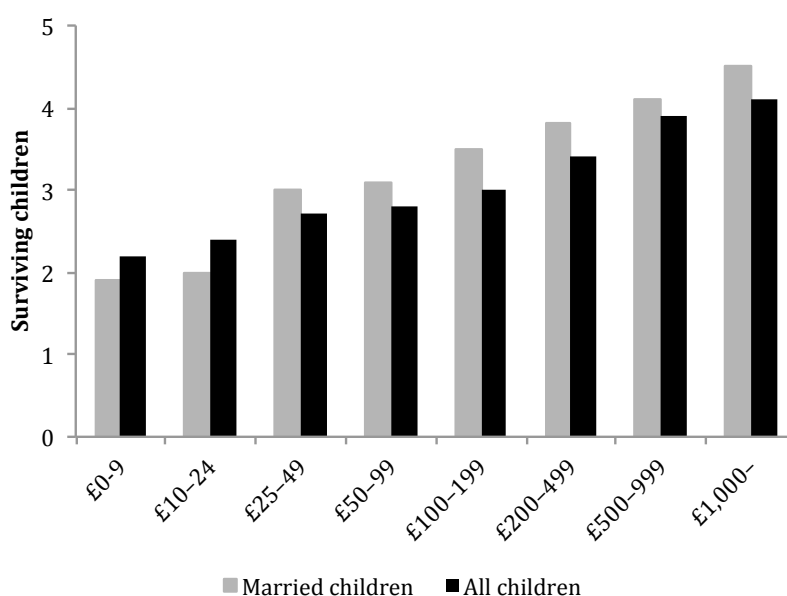
Fig. 4 Reproductive success by wealth (Source: Clark and Hamilton 2006)

Clark and Hamilton (2006) provide an example of a crossroad study between assessing the validity of the Malthusian model and using its predictions. One of the key features of the Malthusian model is that there is a unique equilibrium wage rate at which births equal deaths. But since the reality is that some families in this equilibrium earn more than others, the Malthusian model implies that the rich have more surviving offspring than the poor. Clark and Hamilton used statistics from will records to test this implication, investigating the relationship between the total value of the wealth left by male testators and the total number of offspring who inherited their wealth. Their results are replicated in Fig. 4.
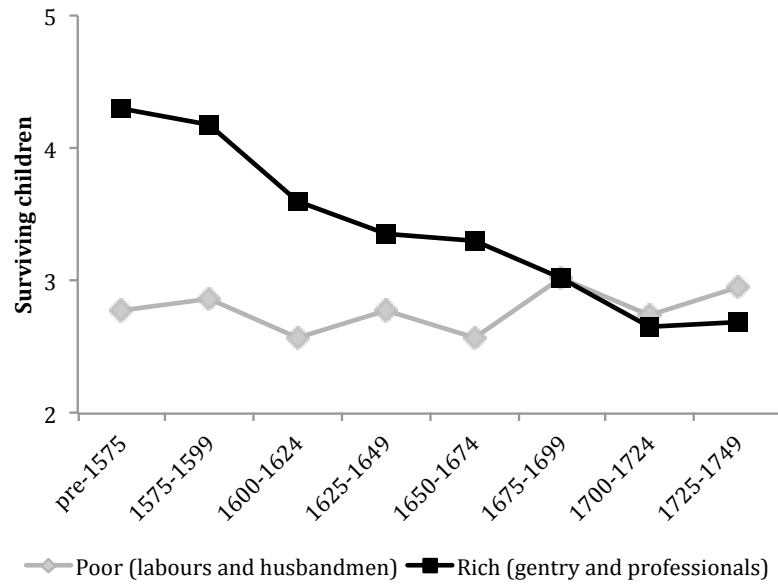
Fig. 5 Reproductive success of rich and poor (Source: Boberg-Fazlic et al. 2011)

The same exercise can be conducted using church book family reconstituted data. What the church book registry lacks in terms of wealth information, it compensates for by its vital statistics. Not only does it provide the total number of births by family; it also permits a count of how many of these children actually made it through into their reproduction period (i.e., lived beyond the age of 15). By exploring the CAMPOP statistics, Boberg-Fazlic et al. (2011) divided the male occupational titles found in the church registers across the seven income groups (see above) defined in Clark and Cummins (2015). Figure 5 illustrates how the preindustrial period confirms the inferences of the Malthusian model, and also how this pattern dissolves around the time of the Industrial Revolution.

The CAMPOP family reconstitution was used to look at Malthusian *positive* checks as well. While the magnitude of the *short-term* effects of hardship on mortality has received ample support (e.g. Galloway 1994), little attention has been paid to the *long-term* effects: the influence of hardship on mortality later in life. Klemp and Weisdorf (2012) raised this question looking at the so-called "fetal origins" hypothesis. This is the idea that undernutrition in early life leads to a disproportionate growth in utero and in infancy, which in turn enhances the susceptibility to illness and hence increases the death risk later in life. Using survival analysis, Klemp and Weisdorf find that birth during the great English famine of the late 1720s entailed a largely increased death risk *throughout* life among those who survived the famine. The death risk at age 10 among the most exposed group – children born to English Midlands families of a lower socioeconomic rank – was up to 66% higher than that of the control group (children of a similar social background born in the 5 years following the famine). This corresponds to a loss of life expectancy of more than 12 years.

The Malthusian framework has also been used repeatedly to understand the long-term economic development and the wealth (or lack hereof) of nations. One of the key arguments for why England enjoyed comparatively high living standards in the past is linked to the response of demography to economics. A central hypothesis concerns the parental trade-off between the quantity and quality of their offspring. The existence of a child quantity-quality trade-off is particularly relevant for the assessment of theories that explain the transition from millennia of economic stagnation to an era of sustained economic growth as well as the accompanying demographic transition (e.g., Galor and Moav 2002). Indeed, the leading theories explaining the origins of modern economic growth depend crucially on the presence of a trade-off between the number of children in a family and the attainment of human capital of the offspring. For instance, Galor and Weil (2000) have argued that the enhancement of technological progress during England's Industrial Revolution motivated parents to invest in the human capital of their offspring, leading to lower fertility and hence slower population growth, ultimately facilitating an increase in income per capita.

Census data has been a generous sponsor of the vital information needed to test the existence of a trade-off effect during early stages of industrialization. Basso (2012) has demonstrated the existence of a trade-off in Spain, Becker et al. (2010) in Prussia, Fernihough (2017) in Ireland, and Perrin (2013) in France. Church book statistics, notably in the form of family reconstitutions, provide an alternative to using census data to test the relationship between the total number of family births and the human capital achievement of the offspring.

The work by Marc Klemp and coauthors provide some examples. Using the CAMPOP data, Klemp and Weisdorf (2019) show a negative link from parental reproductive capacity to the socioeconomic achievements of their offspring later in life. Exploiting the time interval between the date of marriage and the first birth as a proxy for the couples' reproductive potential (i.e., their fecundity) and hence unplanned variation in family size, the authors establish that children of parents of low fecundity were more likely to be literate and employed in skilled and high-waged work than those of highly fecund parents. Along similar lines, Galor and Klemp (2019) have used Canadian church book data to show that a parental disposition toward having many children was not as conducive for long-run reproductive success as more moderate reproductive dispositions: subsequent generations of couples prone to restrained fertility turned out to be more successful in terms of reproduction than those of more fertile couples.

Finally, the church book data can be linked up with other databases. Klemp et al. (2013) provide an example of how the CAMPOP family reconstitution data has be linked with records of substantial educational achievements. Although the church books may provide someone's occupational title, and hence give a hint about the educational attainments of the person in question, they do not record any specific information about the schooling or actual occupational training. By use of a matching procedure, Klemp and coauthors were able to link up the vital statistics from the church books with information from nationwide Stamp Tax registers providing the names of apprentices and fees paid by apprentices to masters. The linkage of family data to individual apprenticeship training opens the possibility to explore a long line of questions regarding parental education decisions, such as whether parents followed customary tradition (e.g. birth order) or decided to educate children was based on their aptitude.

The availability of church book records is, of course, not limited to Britain and continental Europe. Wherever the European missionaries went, they left a trace revealing the local demography elsewhere. More than that, because the missionaries brought with them the recording methodologies used in Europe, church book registry elsewhere is often fully identical to the registry in Europe. This means church book data of the Americas, Asia, and Africa can help understand the economic development, or lack hereof, in the third world, particularly those areas that were previously colonized by Europeans (see, e.g. Siiskonen et al 2005).

One of the main topics in the context of understanding the Great Divergence between Europe and the third world is the influence of European colonial powers on the economic development of third-world regions. Figure 6 captures this Great Divergence between England on the one hand and sub-Saharan Africa on the other (Frankema and van Waijenburg 2012).
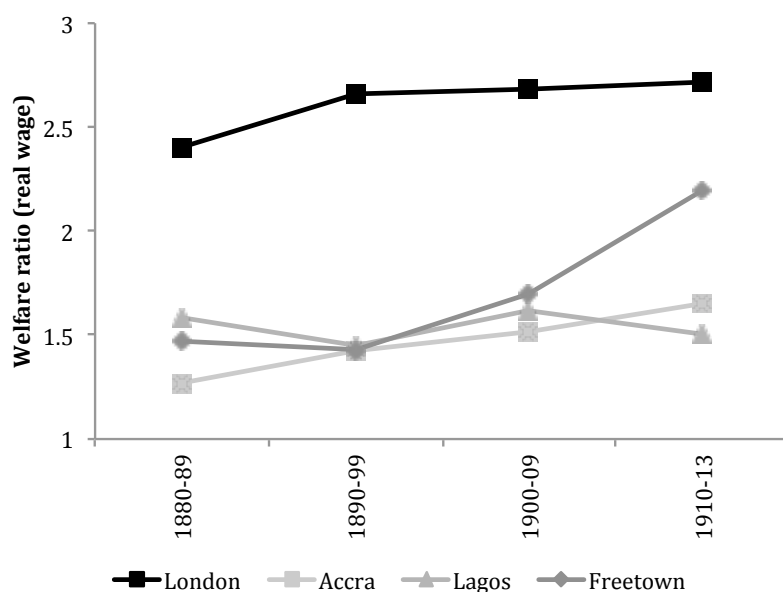

Fig. 6 The Great Divergence between Europe and Africa (Source: Allen 2001, Frankema and van Waijenburg 2012)

Much of the data used to analyze the Great Divergence between Europe and the third world come from the colonizers themselves. For example, empirical investigations into Africa's economic past are often limited to the study of national-level variables (production, export, taxes, etc.) recorded long ago by colonial agents who gave primacy to numbers concerning the colonizers' own activities. Church book records provide a source of information *independent* of those recorded by the colonizers. Christianity caught on rapidly in Africa, especially in sub-Saharan Africa, which today is predominantly Christian. Some Christian churches, such as the Anglican Church, recorded the occupational information of their affiliates. This means church book data represents a broader section of the population than those working for the colonial administration. Moreover, Christian missionaries often arrived ahead of the colonial agents, making it possible to explore the statistics of the church books to investigate not only the impact of colonial influences on Africans but also the results of African independence.

The work of Felix Meier zu Selhausen and coauthors demonstrates well the potential of Sub-Sahara African church book registers (Meier zu Selhausen 2014; Meier zu Selhausen and Weisdorf 2016; Meier zu Selhausen et al. 2014). The authors have used marriage registers from one of the earliest and largest Protestant churches in sub-Saharan Africa, St. Paul's Cathedral in Kampala, Uganda, to study the long-term evolution in human capital formation and labor market participation among Protestants affiliates. British missionaries arrived in Uganda in the 1870s, shortly prior to the British colonizers who ruled Uganda until the 1960s. The chronology in the line of events makes it possible to study the demographic influence of the missionaries, followed by the colonizers, followed by the exit of the colonizers and subsequent independence of Uganda and up until the present day.

The consistent recordings of (especially) women's occupations since the arrival and spread of Protestant missionaries in Africa in the latter half of the nineteenth century made it possible to explore several aspects of gender (in)equalities and the influence hereon of both missionaries and colonial powers. One of the key indicators of female agency is the spousal age gap (Carmichael 2011): the older the husband is and the younger the wife, the more power the husband is assumed to hold and the less agency the wife has. This is also captured by the so-called *girl- power* index, measured as the female age at marriage minus the spousal age gap. By dividing women into two groups, depending on whether or not they engage in salaried work, Meier zu Selhausen (2014) finds that those women who worked for wages married significantly later than others and that the spousal age gap among these women was smaller, and the girl-power index higher, than among other women. Women rarely worked for the colonial administration, however. Their sole employer was the missionaries, who trained and used their expertise in mission schools and hospitals (as teachers, nurses, and midwives).

Other variables used to measure gender inequality include the literacy rates, the numeracy rate (the ability to deal with numbers), the labor force participation rates, the wage rates, and the rates of skilled and nonmanual (high-status) workers. Meier zu Selhausen and Weisdorf (2016) found that males quickly acquired literacy, which helped provide access to formal-sector (salaried) jobs. Women took somewhat longer to obtain literacy and considerably longer to enter into salaried work. The authors observe a *gender Kuznets curve*: although inequality in literacy and access to salaried jobs grew substantially larger during the early colonial period, it gradually vanished during the postcolonial period. Today it is largely gone. Figure 7 shows the evolution in the share of men and women employed in salaried work in historic Kampala, indicating the gender gap therein. Ongoing work by Meier zu Selhausen and Weisdorf (2022) shows that the idea of a gendered Kuznets curve applies to British Africa more widely.
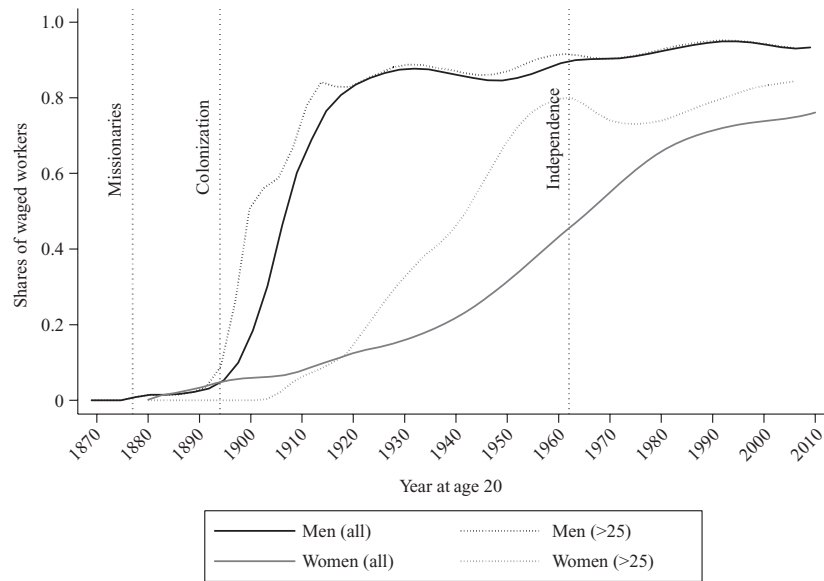
Fig. 7 The shares of Kampala men and women in salaried work (Source: Meier zu Selhausen and Weisdorf 2016)

The passing of Rose's Law (mentioned above) in the early nineteenth century meant that Anglican Protestant records are particularly useful for the purpose of studying social mobility. The reason is the recording of not only the spouses' occupations but also those of their fathers, setting the scene for a study of intergenerational social mobility at the family level. Meier zu Selhausen et al. (2018) found that social mobility in Uganda was very large during the colonial period, primarily because of the salaried labor market that arose following the creation of a colonial economy. After Uganda's independence from the British colonizers, economic development slowed down; fewer new jobs were created; and the prospects for social mobility declined.

Uganda is just one example of how church book records from third-world countries can be explored to shed light on the Great Divergence between Europe and the third world. The missionaries' recordings of vital events can be found practically everywhere the missionaries went, including most of today's developing regions covering the continents of Africa, Asia, and South America.

What Is Next?

There are two scholarly roads forward that can make still better use of church book data in future research. The first is to improve the use of existing data. Many independent datasets exist, but these are currently not directly comparable, making it difficult to conduct cross-country or cross-regional comparison. Comparable work is important to reach an understanding of the influence of demography on the different economic performances of past economies. Further, much of the church book data, which are already transcribed, can be used for the purpose of family reconstitution. This will provide a much more profound understanding of family patterns and household decisions in past societies.

The second road forward concerns the collection of more data. We know practically nothing about the demographic histories in Africa, Asia, and the Americas. By collecting this information, it can be used to shed light on developments and fertility, mortality, life expectancy, literacy rates, occupational structures, gender inequality, social mobility, and their connection to economic development, notably in third-world countries.

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