

THE INCORPORATION OF EVIDENCE ABOUT LOCAL NONCONFORMITY INTO PARISH POPULATION RECONSTRUCTION

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Introduction

Local contemporary sources for England providing continuous population data are elusive before the national census begins in 1801. One approach to this problem has produced a model, developed for the parish of Stonehouse, Gloucestershire, for making population estimates from Anglican parish registers, using Wrigley and Schofield's correction factors.¹ This model may be outlined as follows.

1. Take the baptism and burial totals from the parish registers for each calendar year, and test them for deficiency using a simplified form of Wrigley and Schofield's test.²
2. Adjust these using three factors, as supplied by Wrigley and Schofield, for nonconformity, late baptism and 'other causes' to produce estimated annual parish birth and death totals.³
3. Divide the annual total of births by the national crude birth rate and the annual total of deaths by the national crude death rate to estimate the population totals needed to generate each annual number of births and deaths. This provides two estimated population totals for each year, the one from births usually being the higher.
4. Smooth these two series of population totals using an 11-point moving average.
5. Select the larger of these two population averages for each year, and regard it as the solution to the demographic accounting equation for the previous year, producing a 'population base series'.
6. Smooth the population base series using a 51-point moving average, with appropriate reductions in the number of points at each end of the series.⁴ The result may be called the *long average*.
7. Analyse other sources to construct independent estimates of the parish population during the period of the long average. These sources will include

the early population censuses of 1801, 1811, 1821 and 1831, Hearth Tax returns, diocesan surveys, and other records, and may vary from parish to parish. The census population totals should be augmented using factors developed by Wrigley and Schofield, to compensate for unlisted infants and those serving in the armed forces.⁵ Comparative work indicates that such independent estimates should only be considered if they lie within a range between 0.8 and 1.2 times the long average.

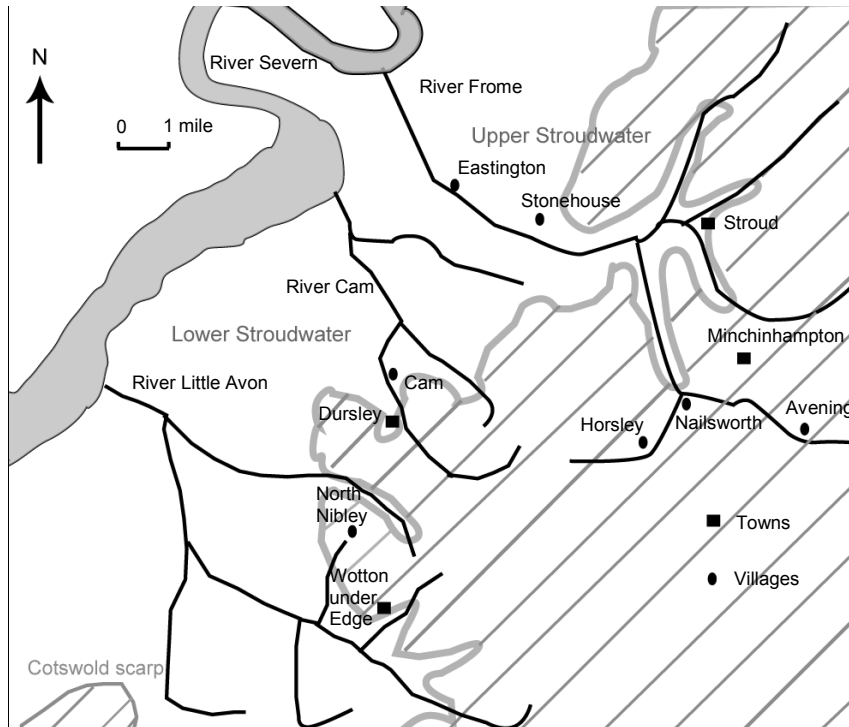
8. Construct a final parish population estimate, as a trend within the range of variation by first accepting the augmented census totals for the 1801, 1811, 1821 and 1831 censuses as definitive. Then, for other years with an independent estimate, take the mean of that estimate and the long average to produce a series of point estimates of the population at given reference years. Finally, calculate estimates for the intervening years by linear interpolation between consecutive reference points which are less than 21 years apart or, if the gap between consecutive reference points is 21 years or more, by connecting the reference points by interpolation to the long average 11 years into the gap.
9. The long average in the Stonehouse model appears to be able to absorb short-term variations in registration data, and to overcome divergence between Wrigley and Schofield's national factors and rates and the true (but unknown) local ones. Unusually rich local sources show this model to be robust in Stonehouse, a parish with comprehensive registration and low levels of nonconformity before 1800. This article will investigate whether the Stonehouse model can be applied in other parishes, particularly those containing nonconformist congregations which kept their own registers.

The sample of parishes

This investigation will be carried out in eight other local parishes, a total of nine including Stonehouse, all within the cloth-producing region of Gloucestershire (Figure 1).⁶ The cloth industry operated before 1800 on a 'putting-out' system. Water-powered mills were used to prepare the wool and to finish the cloth, but weavers and other cloth workers were not bound to them, often working at home. The nine test parishes all depended on cloth, combined with mixed agriculture. Stonehouse, Eastington and Stroud are in the valley of the river Frome, known as Upper Stroudwater. Cam, North Nibley and Wotton under Edge (or Wotton) are in the Lower Stroudwater area, drained by the rivers Cam and Little Avon. Avening, Horsley and Minchinhampton surround the Nailsworth stream. Each of these three groups includes a market town. Minchinhampton and Wotton are on high ground, and were service centres for the surrounding cloth industry. Stroud, on the Frome, became a local capital for the clothing villages. All three are towns within large parishes, which also contain several hamlets. Avening, Horsley and Minchinhampton had seen the village of Nailsworth develop where their boundaries met in the valley, but its population was shared between the three parishes.⁷

These eight parishes are among the 404 parishes selected by Wrigley and Schofield as the basis for their national population reconstruction, indicating

Figure 1 Location map for selected places in the Stroudwater clothing district



Source: R. Perry, *The woollen industry in Gloucestershire to 1914*, (Shrewsbury, 2003), 67.

that that the registers had passed scrutiny and should produce viable data.⁸ The Stonehouse model requires data for calendar years up to 1842, whereas the data for the 404 parishes stops at 1837, so the baptism and burial series for all eight parishes have been extended from the original registers. The registration for the parishes of Amberley and Brimscombe, formed out of the large parish of Minchinhampton in 1836 and 1841 respectively, has been added back into the Minchinhampton event totals up to 1842. Nailsworth was given its own ecclesiastical identity as a chapelry of Avening in 1794, although its population was shared between the parishes of Avening, Horsley and Minchinhampton until it became a parish in 1895. In order to maintain consistent parish data, the totals from the Nailsworth chapel registers have been reapportioned between the three parishes. Unfortunately the parishes of residence are not often given in the chapel registers until after 1813, but the residential proportions found between 1813 and 1842 have been applied to the totals from 1794 to 1812. The Eastington and Avening register series begin in 1558, Minchinhampton in 1561, Cam in 1569, Wotton in 1571 and Stroud in 1625. Horsley offers a good series only from 1652. However, there are baptism records for Horsley covering the period 1594–1641 which have been gathered for use later in this study.⁹

Sources of independent population estimates

The Gloucestershire sources used in Stonehouse can provide population data for the additional eight parishes.¹⁰ These are: the ecclesiastical surveys and censuses of 1563, 1603, 1650, 1676, 1680, 1735 and 1743, a Muster Roll for 1608, the Hearth Tax return for Michaelmas 1672, and two county histories, by Atkyns and Rudder, published in 1712 and 1779 respectively.¹¹ A few parish tithe and rate lists survive, but the only additional demographic source found, apart from the published census reports for 1801–1831, is a full return for the 1811 census in Horsley.¹² The Bishop of Gloucester's diocesan surveys of 1735 and 1743 give two kinds of demographic information for each parish, population totals, and numbers of Protestant nonconformists. A few Roman Catholics are also noted, but they were obliged to conform. The population totals given for the nine parishes are almost all round figures and are of doubtful accuracy. The 1735 figure is repeated in 1743, and in later versions dated 1750 and 1752, in all the parishes except Cam, where no figure at all is given in 1735, and Stonehouse, where a correction is made in 1743. The figures for 1750 and 1752 may have been repetitions without revision in the years leading up to the Bishop's death in 1752. Only the population totals for 1735 will be used in this investigation, except for the parishes of Cam and Stonehouse where the 1743 figure will be used. The incidence of nil returns suggests that the two kinds of information were probably compiled separately, numbers of nonconformists being closely observed and more frequently updated.¹³

The Stonehouse model calls for the augmented census totals from 1801 to 1831 to be accepted as reference points. These are straightforward for five of these eight parishes. Up to 1811, the census describes the ecclesiastical parishes of Avening, Horsley and Minchinhampton. However, in 1821 a separate total is given for Nailsworth, which is 'mostly in the parish of Avening, but extends into the parishes of Horsley and Minchinhampton', and in 1831 Nailsworth is said to be included, without differentiation, in the total for Avening, its ecclesiastical parent.¹⁴ It is therefore difficult to arrive at accurate census totals for the historical parishes of Avening, Horsley and Minchinhampton in 1821 and 1831. A local study has attempted to disaggregate the populations of Nailsworth-in-Avening and Nailsworth-in-Horsley in these years by applying statistical methods to data from the 1841 and 1851 censuses.¹⁵ However, this does not allow for any Nailsworth population in outlying parts of Minchinhampton.

As a first stage in assessing whether the Stonehouse model could be applied elsewhere, the available augmented census totals, for 1801–1831, are compared to their respective long averages (Table 1). The published census totals are also given. Under the Stonehouse model, all the augmented census totals should lie within a range between 0.8 and 1.2 times their respective long averages (the 'range of variation'). Eighty per cent of them (24 out of 30) do so, but there are five above the range (Avening and Horsley in both 1801 and 1811, and North Nibley in 1831), and one below (Eastington in 1801). These discrepancies between the augmented census totals and the long averages can partly be

Table 1 Relationships between augmented census totals and long averages, 1801–1831

Date and source	Avening	Cam	Eastington	Horsley	Minchinhampton	North Nibley	Stonehouse	Stroud	Wotton
PC 1801	1,507	1,285	988	2,971	3,419	1,211	1,412	5,422	3,393
AC 1801	1,575	1,343	1,032	3,104	3,573	1,265	1,475	5,665	3,545
PA 1801	1,140	1,275	1,300	1,884	3,566	1,243	1,372	5,624	3,777
R 1801	1.38	1.05	0.79	1.65	1.00	1.02	1.08	1.01	0.94
PC 1811	1,602	1,501	1,223	2,925	3,246	1,290	1,711	5,321	3,800
AC 1811	1,668	1,563	1,274	3,046	3,380	1,343	1,782	5,541	3,957
PA 1811	1,379	1,541	1,565	2,085	3,742	1,289	1,672	6,302	4,269
R 1811	1.21	1.01	0.81	1.46	0.90	1.04	1.07	0.88	0.93
PC 1821		1,885	1,681			1,553	2,126	7,097	5,004
AC 1821		1,936	1,726			1,595	2,183	7,289	5,129
PA 1821		1,881	1,881			1,356	1,985	7,109	4,985
R 1821		1.03	0.92			1.18	1.10	1.03	1.03
PC 1831		2,071	1,770			1,562	2,469	8,607	5,482
AC 1831		2,120	1,812			1,599	2,527	8,809	5,610
PA 1831		2,157	2,117			1,271	2,474	7,509	5,137
R 1831		0.98	0.86			1.26	1.02	1.17	1.09

Notes: PC - published census; AC - augmented census; PA long average from parish registration; R - ratio of augmented census to long average.

Sources: J. Hudson, 'Parish population reconstruction in Stonehouse, Gloucestershire: an experiment using Wrigley and Schofield's correction factors', *Local Population Studies*, **77** (2006), 37–8; Census of England and Wales, 1801, 1831, *County of Gloucester*, BPP 1801-2 **VI** [9], 114, 115, 122, 125; BPP 1812 **XI** [316], 108, 109, 116, 119; BPP 1822 **XV** [502], 104, 105, 112, 114; BPP 1833 **XXXVI** [149] 200-201, 214-215, 220-221, all available on-line at www.histpop.org.

attributed to local factors which are greater than the long average can absorb. The consistently negative results in Eastington imply that the model is adding too much to the population represented in the parish registers. Conversely, in Horsley and Avening there appears to be a shortfall. Both these parishes contained nonconformist churches with active registration. It is true that there were also such churches in Cam, Stroud and Wotton, where the census is within the range of variation in 1801 and 1811. However, it seems likely that the main cause of the significant positive discrepancies seen in Horsley and Avening could be nonconformist registration, which will have diminished the source data in the Anglican registers. The model does apparently need to be more locally sensitive.

Nonconformist records as demographic sources

Nonconformists were not legally permitted to withdraw from the Church of England before 1689, but many did so during the Civil War and Restoration periods.¹⁶ The Quakers developed their own registration from about 1640

onwards.¹⁷ Under the Toleration Act of 1689, it became possible for Protestant nonconformists to establish their own places of worship, subject to Anglican supervision.¹⁸ There were several meeting houses and chapels before 1800 in the eight parishes studied in this article, not including the later Methodist movement which did not separate from the Church of England until 1795.¹⁹ Nonconformist congregations keeping their own registers were established in the Nailsworth settlement in Avening and Horsley, the towns of Stroud and Wotton, and in Cam, but among these the survival of records from before 1800 is patchy. In Avening, Forest Green Presbyterian chapel replaced open-air meetings in 1688, but its registers only exist for births and baptisms from 1776 onwards, apart from four birth dates for adult baptism candidates extending back to 1732.²⁰ Shortwood Baptist chapel, in Horsley, opened in 1715, but only has birth registers beginning in 1792, and a birth index begun in 1765, which between them provide two or three retrospective entries per year back to 1749. There are also registers of members and church minutes from 1732 onwards, and a short history compiled in 1820.²¹ Registration survives for Quakers in Nailsworth from 1649 onwards, a meeting house was built by 1680, and the regional quarterly meeting was also held there.²² In Stroud, there was a Presbyterian minister in 1690, and the Old Meeting Chapel was built between 1705 and 1711. There are baptism registers for 1712–29, and 1749–1837, and burial registers for 1720–29, and 1753–1837. A history written by the minister in 1826 gives membership information.²³ Wotton had a Presbyterian meeting house from 1701, joined in 1783 by the Tabernacle, and a Baptist chapel from 1717, but no registers for either group survive earlier than 1767.²⁴ The Presbyterian meeting in Cam was founded in 1664, and there are baptism registers from the opening of the chapel in 1702 until 1739, and for the period 1776–1836.²⁵

Nonconformist registration is impaired, as a demographic source, because these meetings were centres for dissent over wide areas. Those attending cross over parish boundaries, and their home parishes may not always be indicated. The registers are also less likely than parish registers to have been preserved as a continuous series. Many were gathered into the General Register Office in 1840, and others have been deposited in local record offices, but the earliest tend to have been lost. Many series consist only of baptisms or births, as not all chapels had their own burial grounds. It is not always clear whether burial registers existed but are missing, or whether burials were taking place in the parish churchyard. At Cam, for example, there are no surviving early burial registers, and the first minister was buried in the nearby parish churchyard in 1740, yet Rudder suggests that by 1779 there were a few burials at the meeting house.²⁶ He is unable to estimate the population of Horsley, owing to the nonconformist burial activity there.²⁷ Church records may give totals for congregations, but these may include Anglican sympathisers who attended both establishments.²⁸

Where a series exists and is fully kept, Presbyterian registers are the most straightforward. The church carried out infant baptism and sometimes recorded dates of birth. Some ministers did record home locations, for example

in Cam a third to a half of the baptisms were of children from that parish. However, at Stroud, home locations are only given between 1761 and 1778. At Forest Green chapel, Avening, the home parish is hardly recorded before 1785. A note sent by the minister with the Forest Green registers, when they were submitted in 1838 to the government commissioners, observes that 'many births and baptisms have never been entered, others but partially. It has always been difficult to obtain from many persons the date of the birth as at a public baptism they frequently present children without the previous knowledge of the Minister and depart before he can ascertain the requisite particulars. This has arisen partly from Dissenters viewing baptism simply as a Religious Ordinance and partly from the apprehended inutility of Dissenters Registers'.²⁹ This last remark refers to the legal uses of registration.

Baptists only admitted those as members who were baptised at a minimum age of 16 on an adult profession of faith, and only they were recorded in the register of members. Baptists also kept registers of the births of members and their families, often recorded retrospectively in a group at the time that the adult became a member. These births might have happened in different parishes, and perhaps before an affiliation to the Baptists had developed. At Shortwood Chapel, Horsley, a third of births dated before 1790 are given with no locations, or simply described as being 'of Nailsworth', making redistribution by date and place difficult. Alternatively, all these births could be counted in the year of registration, relying on the model to distribute them. In 1795 there were 121 retrospective baptisms in the first complete year of registration at Nailsworth Anglican chapel, of which an estimated 36 were from Horsley, nine times the annual average of three or four thereafter. When this peak is distributed, by the process of building the long average, it adds the population equivalent of 0.9 births per year in Horsley between 1774 and 1813, tapering away at either end. However, the lack of information on location prevents such a redistribution of most Baptist registration.

Thus Baptist church records do not offer accessible demographic data. At Shortwood, the register of members is cumulative, and dates of death are not always recorded. Exclusions for misbehaviour and 'losses' do not mean that people have left their homes: for example the membership register for 1805 mentions a member who 'though excluded, constantly attended'.³⁰ Members are individuals, who may or may not represent a household, and their residence is not always given. In 1735, the diocesan survey counts 343 Baptists in the three parishes of Horsley, Avening and Minchinhampton, the main sources of the Shortwood congregation, but the membership register stands at 65. In 1800 the register of members shows a running total of 561, of whom 195 had died, and 33 had definitely left home, leaving a total of 333. However, if 61 exclusions, who may or may not still be resident, are subtracted, the membership total varies between 231 and 272, depending on whether or not the 41 on whom there is no information are included. The church records report 251 members in 1799, and 270 in 1800, but a history written in 1820 says that there were 241 members in 1799, 'scattered through a number of parishes'.³¹

The Quakers who registered at the Nailsworth quarterly meeting would travel long distances to attend, as evidenced by some registrations for people from Cirencester. The birth registrations are of infants, but do not always give a home parish until after 1776, by which time numbers had dwindled to one a year until 1807. It might be assumed that registrations with no residence specified belong to Horsley, were it not that some certificates do give Horsley, or just Nailsworth, as a home. Members are therefore difficult to place from registration alone.

Strategies for using nonconformist sources

Data from nonconformist registers could be incorporated into the Stonehouse model, but Wrigley and Schofield's nonconformity factor should first be taken out, to avoid duplication. The resulting reduced long average would represent the data from the Anglican parish registers, converted into population totals, and will therefore be termed the 'registration series'. In the rare event of a continuous series of nonconformist registers being available which record infant baptisms or births, locate burials, and give residence details, the data can be included at the appropriate stages of building the registration series. This would then function as a full long average, provided that the nonconformist registers were comprehensive in respect of nonconformity in that parish, apart from a few people who might visit meeting houses elsewhere and be allowed for by the range of variation. However, most nonconformist registers will not form series which are comprehensive enough to adopt this first strategy. A second option is to develop additional estimates of the nonconformist part of the population from periods of good registration, usually of baptisms or births. It would be unusual to be able to compare birth and death series, or to form moving long averages, from these records. However moving 'short averages', over a minimum of five years, could be formed, and used to augment the registration series at intervals. A final parish estimate would be completed using these interval points. If the nonconformist records cannot even provide regular 'short averages', a third option is to prepare a parish estimate from the original Stonehouse model. This can then be compared with such points as can be formed by adding occasional estimates from the nonconformist registers to a registration series. These isolated points might be difficult to include in the parish estimate, but they might indicate a direction of travel within the range of variation.

Which one of these strategies is adopted will depend on the quality and quantity of the nonconformist records surviving in a particular parish. When comparing parishes, though, it would be helpful to have a general method of estimating nonconformity relative to Anglican registration which could be applied in all parishes, while any available nonconformist data could be used as a cross check in the relevant individual parishes. Such a method is developed in the next section of this paper.

New correction factors to assess local nonconformity

The registration series provides the foundation for the general method. The national nonconformity factors, designed to apply to baptisms and burials, are

Table 2 Relationships between augmented census population totals and the registration series, 1801

Parish	Augmented census	Registration series	Ratio of augmented census to registration series
Avening	1,575	1,089	1.45
Cam	1,343	1,217	1.10
Eastington	1,032	1,239	0.83
Horsley	3,104	1,805	1.72
Minchinhampton	3,573	3,422	1.04
North Nibley	1,265	1,187	1.07
Stonehouse	1,475	1,314	1.12
Stroud	5,665	5,366	1.06
Wotton	3,545	3,687	0.96

Sources: See Table 1 and text.

replaced by new local correction factors, applied to the registration series at a later stage of the model. The final parish estimate should describe local nonconformity, but is still based on Anglican registration.

The augmented census for 1801, already established as a fixed reference point, may be adopted as one end point for this revision. The other may be set at 1640, when Wrigley and Schofield introduce their nonconformity factors. This is not to suggest that there were no nonconformists before 1640, but only that their existence is unlikely to have had any impact on registration. The ratios of the augmented census for 1801 to the registration series for 1801, in all nine parishes, are shown in Table 2. The population in 1640 is regarded as having a ratio of 1.0 to the registers.

Estimates of nonconformity between 1640 and 1801 are most likely to be supplied by the Church of England. The population totals given in the Gloucester diocesan survey of 1735 are suspect, but the number of Protestant nonconformists was probably more carefully calculated. Among these nine parishes, the nonconformity figures for 1735 were revised in 1743 in Avening, Cam, Horsley and Wotton, and those not changed will probably have remained valid. All the 1743 figures are repeated in 1750 and 1752 but, as with the population totals, these will not be used. The totals are mainly of individuals, although families are counted in Horsley and Wotton, computed by the Bishop as five people each. In Wotton in 1735 the survey lists 350 Presbyterians and 50 Baptists, in total 400 individuals. In 1743 there are 80 Presbyterians and 10 Baptists, apparently a severe decline. However, evidence in the 'Baptist Church Book' for Wotton indicates that the 1743 figure for Baptists refers to families. This would represent the same 50 individuals as in 1735, and if the same relationship can be assumed to apply for the Presbyterians, they had increased from 350 in 1735 to 400 by 1743.³²

The ratios are next found between the Anglican population plus the nonconformists, given in the diocesan surveys of 1735 and 1743, and the registration series. In Stroud in 1735, for example, the registration series estimates 4,005

Table 3 Validation of new correction factor for 1676 from Compton census

Parish	Ratio of Compton Census total to conformist total	New correction factor	Ratio of Compton Census ratio to new correction factor
Avening	1.029	1.015	1.01
Cam	1.004	1.117	0.90
Eastington	1.019	1.000	1.02
Minchinhampton	1.043	1.017	1.03
North Nibley	1.002	1.007	1.00
Stonehouse	1.013	1.002	1.01
Stroud	1.001	1.009	0.99
Wotton	1.008	1.053	0.96
Mean			0.99

Sources: See text.

people, and the diocesan survey 100 nonconformists. The ratio of 4,105 to 4,005, rounded to two decimal places, is 1.02. The ratios found for 1735 and 1801 are used to set a first mean ratio of 1735/1801 at 1768, then interpolated approximate mean ratios at 1752 (representing 1751–52), and 1785 (representing 1784–85), then further interpolated mean ratios at 1760, 1776 and 1793. If the ratio in 1640 is taken to be 1.0, similar mean ratios may be derived from 1735, first for 1688, then for 1664 and 1712, then for 1652, 1676, 1720 and 1724. The new correction factors for Gloucestershire are therefore positioned at 1640, 1652, 1664, 1676, 1688, 1700, 1712, 1724, 1735, 1743, 1752, 1760, 1768, 1776, 1785, 1793 and 1801. The whole series could be derived from only three points, in 1640, 1735 and 1801, if the diocesan nonconformity figures for 1743 were not used. These are arbitrary constructions, but they could represent the trend of hidden nonconformity before the Toleration Act of 1689, and its development afterwards.

Validation of new nonconformity correction factors

These new factors may be tested by comparing them, firstly, with the Compton census and, secondly, with alternative points developed from nonconformist registration in Stroud and Cam. The Compton Census of 1676 is believed, in Gloucestershire, to describe the number of nonconformists in a parish in relation to the conformist congregation, usually among men and women over 16. The ratio of the total of both groups to the total of conformists alone might therefore indicate the proportion of nonconformists in the whole population.³³ Compton returns are available for all the parishes in this study except Horsley, and comparisons between their nonconformity ratios, and the new correction factors for 1676, are shown in Table 3. It will be seen that difference between them in seven of the eight parishes is small, supporting the validity of the new factors. The exception is Cam, which had the earliest meeting house in the set, founded in 1664. The new factor may be picking up more nonconformity here than is revealed in the returns to Compton. This may also be the explanation for the negative ratios in Stroud and Wotton, which had active early Presbyterian chapels.

Table 4 Validation of new correction factors using nonconformist registers

Parish	Date	Population derived from nonconformist registers	Date	Population based on new correction factor	Ratio of population from nonconformist registers to population based on new correction factor
Cam	1712	1,082	1712	922	1.17
Cam	1735	1,133	1735	1,050	1.08
Cam	1777	1,027	1776	1,021	1.01
Cam	1782	1,034	1785	1,078	0.96
Stroud	1768	4,218	1768	4,221	1.00
Stroud	1775	4,289	1776	4,349	0.99
Mean					1.03

Sources: See text.

The second test uses the third of the original strategies for using nonconformist sources to compare the two population totals for a given date built by augmenting the registration series, firstly with a new correction factor, and secondly with an alternative point from nonconformist registration. In this set of nine parishes, only Stroud and Cam provide suitable nonconformist registers. The best achievable alternative points are compared, in Table 4, to the populations estimated using the new correction factors. All the populations derived using parish-specific nonconformist registration data are within the range of variation of the relevant new correction factor population, with a mean ratio between the two populations of 1.03. These tests indicate that the new correction factors are useful measures of nonconformity.

Application of new correction factors to construct parish estimates

New correction factors are next constructed for the years between 1640 and 1801 in all nine parishes. They are compared in Table 5 with Wrigley and Schofield's nonconformity factors for baptisms, as it is usually the baptisms which generate the registration series.³⁴ Six of these parishes have mean new correction factors of between 0.95 and 1.04, not far removed from Wrigley and Schofield's mean of 1.02. Stroud also has a close set of new correction factor ratios, in spite of its early and registering Presbyterian chapel. This concurs with the church history of 1826, which records that the level of membership fell after 1726, and was not restored until 1800.³⁵ The negative ratios seen mainly in Eastington, but also in Wotton, will be discussed later. The two sets of factors are close in Stonehouse, where the original model would suffice. However, if it were to be followed in Avening and Horsley, where the two sets diverge, the requirement to link the 1801 augmented census total to the long average of 1791 would manufacture a spuriously steep population rise. Under the general model outlined in this paper, the new correction factors are applied to the registration series to create population totals which, when connected by interpolation to each other, form the 'nonconformity series'. This could stand alone as a parish estimate, being identical to the registration series before 1640, and carrying the usual range of variation. In most parishes, however, it may

Table 5 New correction factor ratios compared with Wrigley and Schofield's nonconformity factors

Date	Avening	Cam	Eastington	Horsley	Minchinhampton	North Nibley	Stonehouse	Stroud	Wotton	WS
1652	1.00	1.04	1.00	1.06	1.01	1.00	1.00	1.00	1.02	1.003
1664	1.01	1.08	1.00	1.11	1.01	1.00	1.00	1.01	1.04	1.006
1676	1.01	1.12	1.00	1.17	1.02	1.01	1.00	1.01	1.05	1.009
1688	1.02	1.16	1.00	1.23	1.02	1.01	1.00	1.01	1.07	1.012
1700	1.02	1.20	1.00	1.28	1.03	1.01	1.00	1.02	1.09	1.013
1712	1.03	1.23	1.00	1.34	1.03	1.01	1.00	1.02	1.11	1.015
1724	1.03	1.27	1.00	1.40	1.04	1.02	1.01	1.02	1.12	1.016
1735	1.04	1.31	1.00	1.45	1.05	1.02	1.01	1.02	1.14	1.016
1743	1.10	1.36	1.00	1.42	1.04	1.02	1.01	1.02	1.16	1.018
1752	1.14	1.26	0.96	1.52	1.05	1.03	1.04	1.03	1.10	1.020
1760	1.19	1.23	0.94	1.55	1.05	1.04	1.05	1.04	1.07	1.022
1768	1.24	1.21	0.92	1.59	1.04	1.04	1.06	1.04	1.05	1.023
1776	1.29	1.18	0.90	1.62	1.04	1.05	1.08	1.04	1.03	1.023
1785	1.34	1.16	0.87	1.65	1.04	1.05	1.09	1.05	1.01	1.032
1793	1.39	1.13	0.85	1.69	1.04	1.06	1.11	1.05	0.98	1.038
1801	1.45	1.10	0.83	1.72	1.04	1.07	1.12	1.06	0.96	1.045
Min.	1.00	1.04	0.83	1.06	1.01	1.00	1.00	1.00	0.96	1.00
Max.	1.45	1.36	1.00	1.72	1.05	1.07	1.12	1.06	1.16	1.05
Mean	1.14	1.19	0.95	1.42	1.03	1.03	1.04	1.03	1.06	1.02

Note: WS - Wrigley and Schofield nonconformity factor for baptisms.

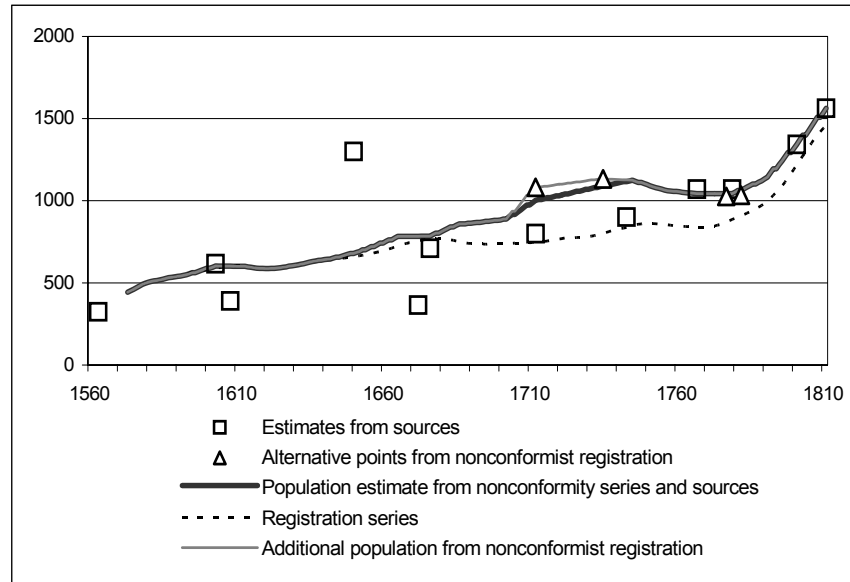
Sources: See text.

next be adjusted against independent sources within the range of variation.³⁶

A widening of ratios in the nonconformity series in the mid eighteenth century is seen in Table 5 in Wotton, Minchinhampton, and very markedly in Cam. Table 2 shows that none of these parishes have 1801 augmented census totals which are out of the range of variation of their registration series, but the nonconformity series identifies additional population in each, which would not have been fully revealed by the original model. The situation in Cam is shown in Figure 2. Alternative points derived from nonconformist registers verify this additional population, and increase its possible extent. A range of variation from 0.8 to 1.2 times a parish estimate based on the nonconformity series would contain the additional population (see Table 4) even if the nonconformist registers were not available to identify it. As these sources are available, however, they are built into the final parish estimate.

The general model can balance itself. In Eastington, the nonconformity series appears to be consistently too high. All the sources before 1779 produce population estimates which lie below the series, except for the Compton Census in 1676, for which the ratio is 1.05. Part of the cause may be the manorial division of the parish between Eastington and Alkerton, seen in the double muster roll of 1608, which gave rise to separate parochial organisations.³⁷ The 1603 diocesan survey, at a ratio of 0.47, may only describe Eastington, any return for Alkerton having been omitted. The ecclesiastical sources for 1650

Figure 2 Parish population estimate and nonconformity in Cam



Source: See text.

and 1680 give minimum rounded estimates of families. The Hearth Tax of 1672 gives low estimates in all the study parishes, and Atkyns in 1712 in almost all. The rounded diocesan survey estimate in 1735 is quite close at 0.87 times the population given by the nonconformity series. The source series is therefore perhaps less anomalous as it might appear. However, the negative new correction factors after 1750 in Table 5, and the negative census ratio in Table 2, are notable. It seems that in Eastington, and to some extent in Wotton, the use of national factors and rates may have produced an over-estimate in the registration series, especially after 1750. The model responds by generating negative factors, which counteract this effect. As a result, Rudder's estimate in 1779, which on this occasion seems to be reliably derived from the parish registers, is at a ratio of 1.01 to the nonconformity series.³⁸

Parish estimates: interaction of general model and sources

The process of completing parish estimates can evaluate other source anomalies. In Horsley, the Hearth Tax return of 1672 is damaged at the start, but there appear to be line spaces for about 95 tax payers. If these are counted as households they suggest a population of 428, at a ratio of 0.81 to the nonconformity series of 530. This is unusually high in this group of parishes, and unexpected from a source which rarely represents a high proportion of the whole population.³⁹ Horsley is known to have been very nonconformist in the

Table 6 Population shortfall in the Hearth Tax returns, 1672

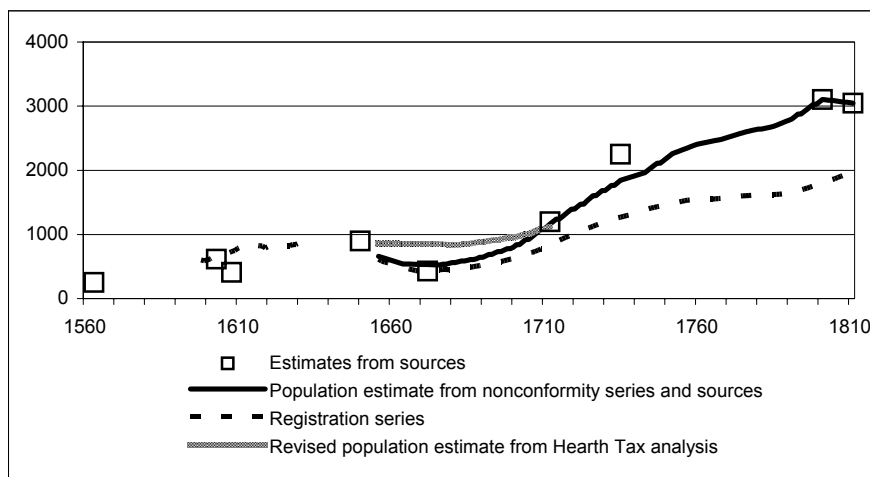
Parish	Hearth Tax payers	Hearth Tax population (Hearth Tax payers x 4.5)	Parish estimate for 1672	Ratio of Hearth Tax population to parish estimate
<i>Rural parishes</i>				
Avening	55	248	547	0.45
Cam	81	365	783	0.47
Eastington	54	243	546	0.45
North Nibley	117	527	1,109	0.47
Stonehouse	65	293	524	0.56
Mean				0.48
<i>Parishes containing towns</i>				
Minchinhampton	130	585	1,779	0.33
Stroud	190	855	2,341	0.37
Wotton	128	576	2,619	0.22
Mean				0.30

Source: See text.

later seventeenth century, and this is probably the reason why it is one of only nine parishes in the diocese without a return to the Compton Census.⁴⁰ The registers need correction for deficiency in the 1670s. The problem is compounded because continuous registration only begins in 1652, so that the annual averages used to build the registration series shorten and become more variable before 1676. The nonconformity series, started in 1656, suggests that the population fell after that date, and did not recover until the early years of the eighteenth century. However, the Hearth Tax evidence raises the possibility that this apparent fall may be due to unusually high levels of under-registration. The Hearth Tax returns for 1672 do not always list exemptions, but they do provide the number of tax payers in all the other eight parishes. Estimates of the taxed population for each parish are set out in Table 6, together with their respective parish estimates for 1672, and the likely shortfall assessed.

In the parishes containing the three market towns, Hearth Tax payers amount to an average of about one third of the population estimate, but in the more rural parishes the average is about a half. Therefore, in order to reach an approximate position in Horsley, the population estimate from the 95 Hearth Tax payers, 428, is doubled, providing a new estimate of 856 in 1672, at a ratio of 1.62 to the nonconformity series of 530. The ratio for 1712, at the end of the deficient period, is taken as 1.0. Mean ratios of 1.15, 1.31 and 1.46 are then applied to the nonconformity series for 1702, 1692 and 1682. A mean ratio of 1.31, the midpoint between 1.0 in 1640 and 1.62 in 1672, may be applied to population total of 658 in 1656, when the nonconformity series starts. This produces a new population estimate for 1656 of 860, with a range of variation

Figure 3 Parish population estimate for Horsley



Source: See text.

which contains the estimate of 900 from the diocesan survey of 1650. The new 1656 point is compatible with short averages produced from the baptism registers for 1594–1641, as is the Bishop’s Census of 1603. A revised nonconformity series between 1656 and 1712 is then calculated from interpolated values between these ratio points, and will form part of the parish estimate, as shown in Figure 3. In Horsley, the model has identified, and provided compensation for, a period of parish registration which falls below even the detected levels of deficiency, emphasising Wrigley and Schofield’s warnings about register reliability.⁴¹

The general model can also be used to assess imprecise sources. In Cam, as shown in Figure 2, the diocesan survey population total of 900 for 1743 is well below the nonconformity series for that year. However, the diocesan total is within the range of variation of the registration series, whereas in all the other parishes except Eastington, the diocesan round figure estimates are much higher even than the nonconformity series. It would seem likely that the diocesan total is a round estimate of conformists only, represented by the Anglican registration, and is therefore not used in the model as an independent population estimate. In Minchinhampton and Stroud the Compton Census of 1676 gives totals of conformists, which are of doubtful accuracy because they are rounded, and which produce results below 0.8 times the population in the nonconformity series. The figure for Stroud is only two thirds of the parish estimate, and possibly refers to the town part only. In North Nibley, Atkyns’s rounded estimate of 1,000 in 1712 is close to the lower limit of the range of variation of the nonconformity series, but, in the context of the general trend, is best regarded as lying outside it. A similar argument applies to his estimate for Cam of 800, which is within the lower range of the nonconformity series, but

below it in relation to the evidence from the nonconformist registers. Rudder gives rounded figures in 1779 which are repeats of the 1735 diocesan survey totals in Minchinhampton, North Nibley and Wotton, and which are well above the nonconformity series at both dates. Even when not rounded, his figures can refer back 20 years or more. However, the model supports his observation that in Stroud the population had not changed greatly since 1756.⁴²

Comparisons between parish estimates

The completed parish estimates and overall growth ratios, 1660–1801, are compared in Figures 4a-4c.

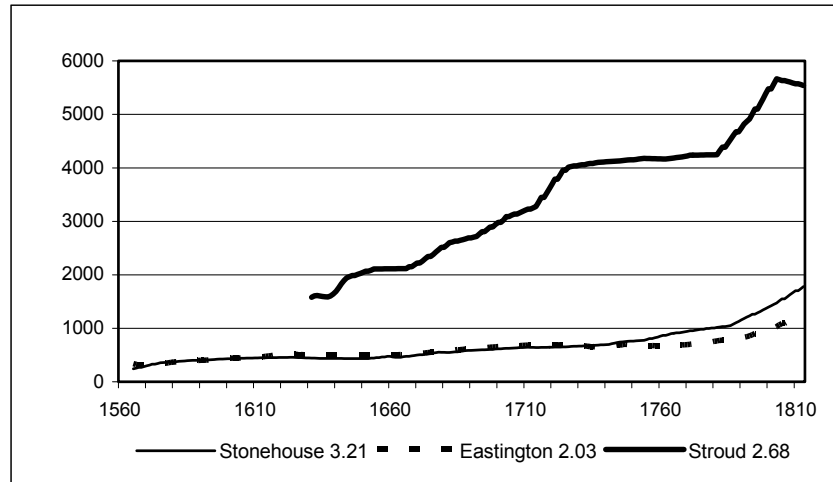
Some general observations can be made from these comparisons. The market towns probably saw faster growth than the countryside before 1660, but they do not show the highest relative population growth in 1660–1801 either within in each group, or overall. The highest growth ratios after 1660 are found in Horsley, Stonehouse and Avening, followed by Stroud, the fastest growing of the towns. This may reflect the nature of the cloth industry, based in the countryside and linked to water-powered mills. The Frome and Nailsworth valleys benefited from improving infrastructure, including the Stroudwater canal, opened in 1779. The lower Stroudwater parishes of Cam, North Nibley and Wotton have the lowest set of growth ratios, and all three of these parishes show a tendency for the population to fall after about 1750 before rising again. This is not seen in the other two groups, and may indicate that the periodic depressions in the cloth industry had more impact in this locality.⁴³ All nine parishes show some degree of population growth after 1780, as is also seen in the national model developed by Wrigley and Schofield. Horsley, Avening and Stroud suffered a decline in population between 1801 and 1811. The 1811 parish census return for Horsley concludes with a note that ‘the deficiency in ten years may be well attributed to a great number of Males having inlisted in the Army and Militia, and to a decay in the Cloth Manufactory which has occasioned many families to emigrate to other parishes’.⁴⁴

Conclusion

The parish population reconstruction model developed for Stonehouse uses all three of the national correction factors developed by Wrigley and Schofield. It can produce valid results in a parish where nonconformity has not significantly diminished the comprehensiveness of Anglican registration before 1800. However, when applied to other parishes, it is seen to require adjustment to incorporate the effects of active nonconformist registration. Where useable nonconformist records exist, the additional data could be added directly, but it is not often possible to identify nonconformist data on a parish basis. The Stonehouse model is therefore adjusted as follows.

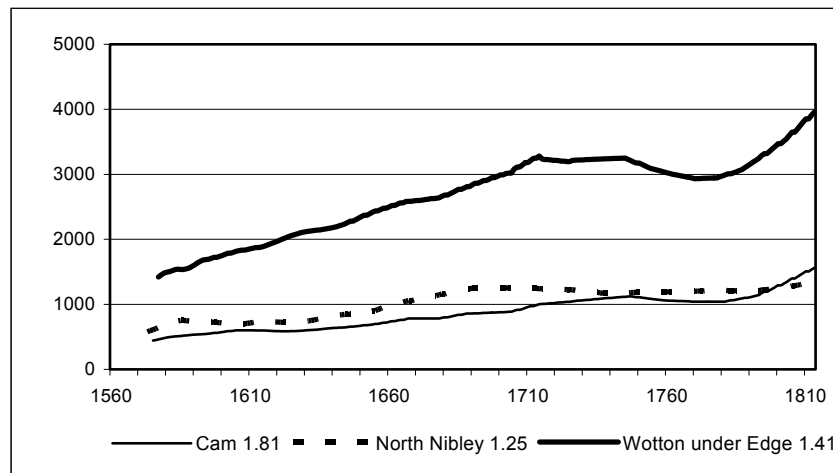
1. Prepare the parish data (original stages 1–6), but omit Wrigley and Schofield’s correction factor for nonconformity. A reduced long average is produced which might be called the *registration series*.

Figure 4a Upper Stroudwater growth patterns 1560–1811, with growth ratios 1660–1801



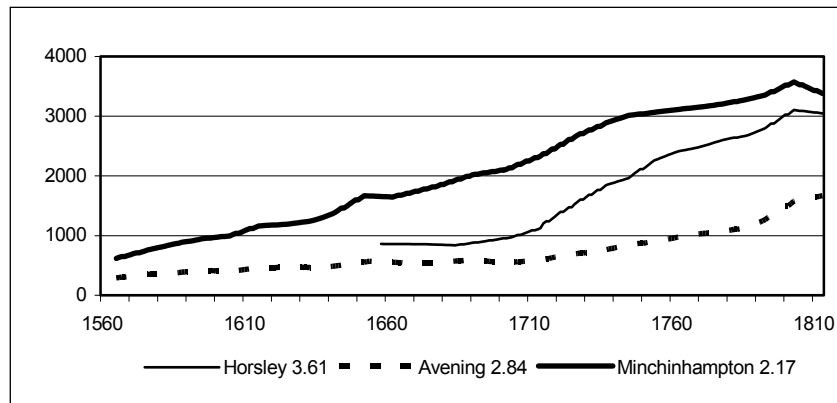
Note: The numbers in the legends are the growth ratio
Source: See text.

Figure 4b Lower Stroudwater growth patterns 1560–1811, with growth ratios 1660–1801



Note: The numbers in the legends are the growth ratio
Source: See text.

Figure 4c Nailsworth area growth patterns 1560-1811, with growth ratios 1660–1801



Note: The numbers in the legends are the growth ratio

Source: See text.

2. Take the ratio between the registration series and the augmented 1801 census, and a ratio of 1.0 in 1640 as end points. Find at least one intervening ratio from contemporary estimates of nonconformity. Create a series of ratios by interpolation, and apply them to the registration series to construct the *nonconformity series*.
3. Analyse other sources to construct independent estimates of the parish population, provided that those sources indicate populations within a range between 0.8 and 1.2 times the nonconformity series.
4. Construct a final parish population estimate following the methods outline in stage 8 of the original model, but using the new nonconformity series.

If this approach is applied in all parishes, population hidden in nonconformist registers may be revealed, as in Cam. Where comparative work on sources shows the underlying registration series to be deficient, as in Horsley, compensatory ratios can be developed from the general model to revise the nonconformity series. The registration series and the new correction factors together can describe a parish where nonconformity significantly affects parish registration, and can also provide a valid population estimate when independent sources are not available. This approach is still founded on Wrigley and Schofield's work, but adjusts it further. The general model is more locally sensitive, and therefore more widely applicable, than the original Stonehouse model. Comparison of the trends seen in the parish estimates it produces could suggest further investigations into local historical demography.

Acknowledgements

Valuable comments and advice by Dr Andrew Hinde and other members of the *Local Population Studies* Editorial Board, are gratefully acknowledged.

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