PART I

Measuring economic growth

1 Population

1.1 INTRODUCTION

Economic growth can be either extensive or intensive. Extensive growth arises where more output is produced in line with a growing population but living standards remain constant, while intensive growth arises where more output is produced by each person. In the former case, there is no economic development, as the economy simply reproduces itself on a larger scale: in the latter, living standards rise as the economy goes through a process of economic development. To understand the long-run growth of the British economy reaching back to the thirteenth century therefore requires knowledge of the trajectories followed by both population and GDP. Of particular interest is whether periods of intensive growth, distinguished by rising GDP per head, were accompanied by expanding or contracting population. For it is one thing for living standards to rise during a period of population decline, such as that induced by the recurrent plagues of the second half of the fourteenth century, when survivors found themselves able to add the land and capital of those who had perished to their own stocks, but quite another for living standards and population to rise together, particularly given the emphasis of Malthus [1798] on diminishing returns. Indeed, Kuznets (1966: 34–85) identified simultaneous growth of population and income per head (i.e. the concurrence of intensive and extensive growth) as one of the key features that distinguished modern from pre-industrial economic growth.

A full discussion of these issues surrounding the transition to modern economic growth will have to wait until after the estimates of GDP per head have been established in Part I of this book. Meanwhile, the first task is to reconstruct population numbers. The reason for

giving this priority is not just because of its importance in estimating GDP per head, nor even because extensive growth is also of interest in its own right. Rather, it is because, following a long tradition started by Deane and Cole (1962) in their pioneering study of British historical national accounting, estimation of some of the component parts of GDP requires knowledge of the size of the population. Indeed, as will become clearer later, the scale of the population feeds directly into the estimation of the output of parts of the service sector. Aggregate development of England's population since 1541 is now firmly established, and there is little disagreement respecting the population of the rest of Great Britain after 1700. This chapter will therefore focus its attention on reconstructing English population before 1541, where there is some controversy.

The pioneering work on English medieval population by Russell (1948) established benchmark levels of population for 1086 and 1377 and deployed time-series evidence to link these to each other and to estimates for the early modern period. Russell paid particular attention to the consistency of his estimates over this long sweep of history and arrived at the conclusion that the peak level of medieval population before the Black Death was around 3.7 million. This view was challenged by Postan (1966), who criticised both of Russell's benchmarks as unrealistically low. He advocated a much higher level of population throughout the medieval period, and a peak level before the Great Famine of around 6 million, but did not consider the difficulties of reconciling such high figures with the early modern estimates, which have subsequently been established more firmly by Wrigley and Schofield (1989). Furthermore, it must be noted that Postan (1966: 561) regarded any such quantitative exercise with a high degree of scepticism, reflected in his phrase 'the lure of aggregates'.

Postan's view of medieval population has proved influential, with Smith (1988: 191) concluding that 'there is every reason to accept an English population in 1300 of over 6 million'. Yet not all have been convinced. In particular, Blanchard (1996) points to the lack of substantive evidence offered by Postan (1966) and subsequent writers for

their criticisms of the main assumptions underpinning Russell's 1086 and 1377 benchmark estimates, and endorses a lower rather than higher estimate of the population at its pre Black Death peak. In like vein, Campbell (2000) questions whether domestic agriculture could have provided enough food for more than 5 million people. It is worth noting that by the 1650s, when the economy was more developed and technology more advanced, the population still numbered barely 5.4 million. Also at issue are whether the Great Famine of 1315–22 or Black Death of 1348–9 constituted the key demographic turning point, the scale and duration of the fifteenth-century downturn in numbers, and when the upturn began that was clearly in full swing by the 1540s when the first parish registers come on stream.

The chapter proceeds as follows. Russell's (1948) benchmark estimates of population levels and evidence on rates of population change during the medieval period are critically reviewed in Section 1.2. Section 1.3 then derives a new time-series for aggregate population from manor-level data on tenant numbers using an appropriate regional weighting scheme. The absolute level of the population in the medieval period is pinned down by linking the estimated time-series to the revised benchmark for 1377, with the need for consistency with the benchmarks for 1086, 1522 and 1541 limiting the degrees of freedom. Russell's benchmarks for 1086 and 1377 are shown to have been too low, but not by as much as suggested by Postan (1966), so that the medieval population peaks at less than 5 million. How the national total was distributed across counties and how that distribution evolved over time is then considered in Section 1.4. Sections 1.5 and 1.6 set out the much less controversial trends in population for, respectively, England from 1541 to 1700 and Great Britain from 1700 to 1870.

1.2 THE BUILDING BLOCKS OF MEDIEVAL POPULATION ESTIMATES

To be convincing, estimates of English medieval population must be able to encompass both the macro cross-sectional evidence for a number of benchmark years, including most obviously that from

Domesday Book for 1086 and the poll tax returns of 1377, as well as the time-series evidence amassed by scholars over the years from diverse mostly micro-level sources. The time-series must be able to link up the medieval benchmarks as well as connect to the more reliable population estimates for the early modern period, starting in 1541. Although the quality, quantity and range of the available evidence are superior to those extant for most other countries at this early period in time, reconciling the cross-sectional and time-series data with each other and with the more firmly grounded estimates available from 1541 is far from unproblematic.

1.2.1 A benchmark for 1086

A benchmark estimate of the population in 1086 can be derived from Domesday Book. The pioneering study was by Russell (1948) and his assumptions are set out in the first column of Table 1.01. The starting point is the total of rural households recorded in Domesday Book, to which must be added tenants-in-chief and under-tenants, as well as an allowance for the omitted four northern counties. Russell applied an average household multiplier of 3.5 to arrive at total rural population. Finally, he made an allowance for urban population, since towns were largely omitted from William I's great survey. Darby (1977: 89) presented a number of alternative estimates. One issue is whether slaves should be included as household heads, as in Russell (1948), or individuals. Nevertheless, as there were only 28,100 slaves, this does not make a very large difference and is not pursued here. Of more significance is the effect of increasing the household multiplier. Darby (1977: 88) claimed that later medieval evidence suggests a multiplier of 4.5 to 5.0, and that the figure for 1086 is unlikely to have been much less. Using Russell's assumption results in a total population of 1.11 million, while Darby's approach yields a population of between 1.45 and 1.60 million.

Although Harvey (1988: 48–9) did not present any underlying calculations, she claimed that the Domesday population could well have approached 2 million. Rather than arguing for a higher household multiplier, Harvey (1988) proposed a much greater scale of omissions

Table 1.01 *Alternative estimates of English population in 1086 (thousands except where otherwise specified)*

	Russell's estimate	Darby's estimate (I)	Darby's estimate (II)	Harvey's estimate
Recorded rural households	268.3	268.3	268.3	268.3
Omissions rate (%)	*0.0*	*5.0*	*5.0*	*25.0*
Allowance for omissions	0.0	13.4	13.4	67.1
Tenants-in-chief	1.1	1.1	1.1	1.1
Under-tenants	6.0	6.0	6.0	6.0
Northern counties	6.8	6.8	6.8	6.8
Total rural households	282.2	295.6	295.6	349.3
Household multiplier (persons)	3.5	4.5	5.0	5.0
Total rural population	987.7	1,330.2	1,478.0	1,746.5
Urban population	117.4	120.0	120.0	120.0
TOTAL POPULATION	1,105.1	1,450.2	1,598.0	1,866.5

Sources and notes: Derived from Russell (1948: 54); Darby (1977: 63, 89); Harvey (1988: 48–9). For ease of comparison, there are two very small adjustments to the original estimates. First, there is a slight discrepancy with Darby (I) because Darby did not allow his total for northern counties to vary with the household multiplier. Here, the number of households in the northern counties is held constant across the different estimates, so that the population in those counties increases with the household multiplier. Second, Russell's urban population includes clergy.

than the 5 per cent allowance made by Darby (1977), on the grounds that Domesday Book was more concerned with the landed wealth of the tenants-in-chief and their head tenants, and hence tended to under-record or omit independent smallholders, sub-tenants and those who were landless. The final column of Table 1.01 presents an estimate of

the English population in 1086 in the spirit of Harvey's assumptions. This involves increasing the rate of omissions from 5 per cent to 25 per cent – the maximal scale of omissions claimed by Postan (1966: 562) for the poll tax of 1377 – which results in a population of 1.87 million. Note that for the population to exceed 2 million, which Harvey (1988: 49) claims should not be ruled out, would require an omissions rate of the order of 40 per cent.

1.2.2 A benchmark for 1377

It is also possible to obtain a benchmark estimate of population from the returns to the poll tax of 1377, which was levied at a fixed rate on adult males and females. The key assumptions made by Russell (1948: 146) to derive a population total for England are the proportion of children in the population and the rate of under-enumeration. Russell's assumptions and results are set out in the first column of Table 1.02. Postan (1966: 562) suggested alternative assumptions, leading to the results set out in the second column of Table 1.02. Whereas Russell

Table 1.02 *Alternative estimates of English population in 1377*

	Russell's estimate	Postan's estimate	'Best estimate'
Laity	1,355,555	1,355,555	1,355,555
Clergy	30,641	30,641	30,641
Allowance for Cheshire, Durham and mendicant friars	31,994	31,994	31,994
Adult total	1,417,380	1,417,380	1,417,380
% share of population under 15 years	*33.3%*	*45.0%*	*37.5%*
Allowance for children	708,690	1,159,675	850,428
Total including children	2,126,070	2,577,055	2,267,808
Assumed % rate of under-enumeration	*5%*	*25%*	*10%*
Allowance for under-enumeration	106,303	644,264	226,781
TOTAL POPULATION	2,232,373	3,221,319	2,494,589

Sources: Russell (1948: 146); Postan (1966: 562).

assumed that children under the age of 15 accounted for 33.3 per cent of the population, Postan suggested that the ratio may have been as high as 40 to 45 per cent. For the period after 1541, when reliable data become available, the percentage of under-15s in the population never rose above 40 per cent, which surely represents the upper limit for 1377 (Wrigley and Schofield, 1989: Table A3.1). As Blanchard (1996) points out, such a high ratio tended to occur in periods of rapid population growth driven by high fertility. Since population was declining in the aftermath of the Black Death, a ratio as high as 40 to 45 per cent in the 1370s is improbable and a lower ratio more likely.

The second assumption of Russell that was challenged by Postan concerns the assumed rate of under-enumeration. Russell's figure of 5 per cent is based on an examination of the distribution of terminal numbers of local tax returns for evidence of excessive rounding, together with an allowance for 'indigent and untaxed persons'. Postan suggests a much higher rate of 25 per cent, which he justifies with reference to discrepancies between the poll tax returns and unspecified manorial sources. Poos (1991), however, supports Russell's ratio on the basis of a comparison of the poll tax returns and tithing evidence for a sample of Essex parishes. For a later period, Campbell (1981: 150) uses the discrepancy between the tax returns of 1524–5 and the muster rolls of 1522 to infer an evasion rate of males varying from a minimum of 5 per cent to a maximum of 20 per cent, arguing for an average figure of the order of 10 per cent. The poll taxes, of course, taxed both adult males and females, and although the latter may have been less visible to the taxers than the former, Goldberg (1990: 200) concludes that 'the under-enumeration of women cannot have been a serious fault of the earlier [i.e. 1377] returns'.

Russell's assumptions of a children's share of 33.3 per cent and a 5 per cent under-enumeration rate yield a population total for 1377 of 2.23 million, while Postan's assumptions of a children's share of 45 per cent and a 25 per cent under-enumeration rate lead to an estimate of 3.22 million. The third column of Table 1.02 presents a 'best estimate' of 2.50 million, based on a children's share of 37.5 per cent and

an under-enumeration rate of 10 per cent, which is more in line with Wrigley and Schofield's demographic evidence and the evidence of tax evasion from Poos and Campbell.

1.2.3 Population trends, 1086–1317

The next step is to establish population trends between the two benchmarks and link them up to the early modern estimates of Wrigley and Schofield (1989), as amended in Wrigley and others (1997). The starting point is the time-series evidence of tenant numbers assembled by Hallam (1988) for the period 1086–1317. Hallam's methodology was to find population estimates for individual manors at benchmark years from diverse sources and compare them with the population for the same manors given in Domesday Book. Index numbers of population were then constructed for up to eight regions and for the country as a whole, taking account of regional diversity. The composition of the eight regions used by Hallam is indicated in the notes to Table 1.03. To obtain a reliable index of population for England as a whole, it is important to ensure a balance between the relatively high-density core regions to the south and east of a line running roughly from the Wash to the Severn Estuary, and the lower-density peripheral regions to the north and west of this line, including southwest England.

Hallam's (1988) estimates (Table 1.03) suggest that population in the country as a whole roughly tripled between 1086 and 1262, before stagnating to 1317. Unfortunately, there are a number of problems with these estimates, which become apparent upon close inspection of the data. First, dividing the dataset into eight regions means that the number of observations for any particular region is quite small, making it difficult to place much faith in the regional breakdown, even if the aggregate picture is reasonably plausible. Thus, for example, it seems inconceivable that the population of northern England could have behaved in the wildly volatile fashion suggested by Table 1.03. Second, when the underlying data presented by Hallam (1988) are examined in more detail, it becomes apparent that although the estimates are presented for particular years, they often cover an extremely wide range