Introduction

Studies in ancient historical demography

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Populations in the past behaved in diverse ways in terms of fertility, mortality and migration – the key elements of demographic dynamics. There are many variables which influence these dynamics, including environment and epidemiology, economic activity, urbanisation, reproductive decision making and war. These variables are socio-economically and culturally specific, and are therefore likely to impact differently on populations across time and place. Population historians of most periods in European history have long acknowledged such specificity and diversity in population dynamics and behaviour; in fact, established models that suggest 'regional' patterns of demographic behaviour and fail to take diversity into account have recently been challenged with data from a range of populations.[1] Similarly, the notion that all pre-modern populations can be grouped together and be seen to behave in the same way as one another is no longer tenable.[2] Accordingly, ancient historians must view the populations of the Graeco-Roman world against the backdrop of their environmental, socio-economic and cultural diversity. The populations of the areas discussed in this volume – Athens, Rome, the metropolises and villages of Ptolemaic and Roman Egypt, and the rural and coastal demes in Attica – all existed within specific contexts determining, at least in part, the variables shaping their population dynamics. For this reason we cannot categorise the range of populations of the Graeco-Roman world along with all pre-modern European populations, nor can we see them as making up one distinct and homogeneous category of their own. On the other hand, there are lots

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[1] Livi-Bacci, 2007. See also Woods, 2003a, 2003b. Regional patterns, for instance the 'European marriage patterns' of late marriage, proposed by Hajnal, 1965, and the family formation patterns suggested by Laslett and Wall, 1972, have been contradicted by census data from Nordic countries, among others; see Pudsey in this volume.

[2] The model suggesting this, known as demographic transition theory, has been challenged by many studies: see discussion in Morley in this volume.

of commonalities between the populations of the ancient, pre-modern and more recent past. The value of comparative research on population lies in establishing what these common relationships are, and the ways in which an understanding of one population in its particular context can help to develop a fuller picture of another. For the ancient historian, for instance, a study on population in early modern England can suggest not only the differences but also the similarities in the ways in which individuals, families and populations influence and respond to social and economic change.

Historical demography is important precisely because a wide range of responses to social and economic change can be observed through the study of a population's demographic dynamics. Demographic dynamics should, therefore, be central to any socio-economic analysis of the ancient world. This goes beyond simply knowing the size of any given population, and encompasses the structure and dynamics of a population: mortality, fertility, migratory movement and family structure should all be considered. In recent decades ancient historians have begun to recognise the exciting possibilities afforded by taking a demographic approach to the study of the ancient world. Brunt famously wrote that any statement about the Romans is meaningless if we do not know how many Romans there were, but in the years since this was written there have been a number of key shifts in approach to the serious incorporation of demography into ancient history.[3] A number of groundbreaking studies have sought to evaluate the relative significance of population size and behaviour in ancient societies and economies.[4] These studies, surveyed below, have laid the foundation for the relatively new discipline of ancient historical demography; further studies, also surveyed below, have built on this, expanding the discipline to shed more light on particular debates in Greek and Roman history.

Hopkins's hugely influential article of 1966 was the first work in ancient history to advocate employing demographic model life tables.[5] He used these to demonstrate that collections of ancient epigraphic individual age data were too statistically flawed to be of any use to the population historian, highlighting the mathematical implausibility of some demographic conclusions that had previously been drawn from these data.[6] The importance of Hopkins's article lies not only in its introduction of model life tables to ancient history – which have since become commonplace – but also in its

[3] Brunt, 1971: 3.
[4] For the most up-to-date discussion of ancient demography, see Scheidel, in press a; also, Scheidel, 2001c, 2007b.
[5] Hopkins, 1966. See discussion below, pp. 4–5, on model life tables and their uses in ancient history.
[6] Principally by Burn, 1953. See Akrigg in this volume.

explicit acknowledgement of the relationship between individuals in the past, and the age and sex structures of the populations of which they were members. Hansen's influential *Demography and Democracy* also made use of model life tables for Greek history. Hansen remains a central figure in highlighting the important role played by population in Greek history, and *Demography and Democracy* was particularly influential in demonstrating the potential impact of demographic dynamics on Athenian politics.[7] Hansen's more recent work on the structure and institutions of the Greek polis has continued to give due weight to the importance of population and its dynamics.[8] Sallares's study *The Ecology of the Ancient Greek World* (1991) also marked a key development, as the author stressed the significance of ecological factors in creating specific disease environments; these cause mortality patterns to vary between geographical regions.[9] He revisited this issue in his *Malaria and Rome* (2002), which focused on the disease environment of ancient Italy.[10] Scheidel also demonstrated the importance of the disease environment in shaping the mortality regime of Roman Egypt in his *Death on the Nile: Disease and Demography in Roman Egypt* (2001).[11]

Roman historians have, in general, been better placed than Greek historians to exploit the potential of demographic approaches to ancient history.[12] Material which lends itself relatively easily to demographic inquiry has survived in greater quantity from Roman populations and, consequently, has framed the debates and narratives of Roman history: the survival of Augustan census figures and archaeological material, for example, has been used to argue for vastly different population counts in late republican Italy and correspondingly different accounts of the agrarian history of the late republic.[13] The incorporation of demography into Roman history was helped in part by Parkin's book *Demography and Roman Society* (1992), which placed fertility, mortality and migration within the context of the surviving source material from the Roman world. This material includes the

[7] Hansen, 1985. For key studies of the demography of the Greek world see Corvisier, 1985; Hansen, 1985, 1988, 2006a, 2006b; Sallares, 1991; Scheidel, 2003b.

[8] See, for example, Hansen, 2005, 2006a; Hansen and Raaflaub, 1995, 1996.

[9] Sallares, 1991. Horden and Purcell, 2000, also discuss the relationship between environment and disease. For the importance of ecological factors in determining the impact of disease on mortality, see Scheidel, 2001c: 77–9.

[10] Sallares, 2002.

[11] Scheidel, 2001a.

[12] For key studies of the Roman world, see Saller, 1987, 1994; Parkin, 1992; Bagnall and Frier, 1994, 2006; Frier, 1994; Scheidel, 1996, 2001a, 2001b, 2001c, 2001d, 2003a, 2004a, 2004b, 2005, 2007b, 2007c, 2008c, in press a; Morley, 2001, 2003, 2006b; Shaw, 2001; Sallares, 2002; de Ligt, 2004; Rosenstein, 2004; Woods, 2007; de Ligt and Northwood, 2008.

[13] See now de Ligt and Northwood, 2008, and below, p. 5. See Hin, Holleran and Morley in this volume.

juridical texts known as 'Ulpian's life table' (an ancient estimation of mortality of Romans used for calculations of loan repayments), skeletal data from Roman provinces, and census documents listing household members, their ages and their relationships to one another in Roman Egypt.[14] Parkin used this material to show that ancient historians can learn about life, death, old age and the movement of people when the material is approached from a demographic perspective. This accessible study was instrumental in introducing the methods and material of a potentially marginal and technical specialisation to Roman historians, and highlighted many of the issues involved in using legal, written and other source material for our understanding of birth, death and mobility.

Of all the demographic material surviving from the Graeco-Roman world, the Romano-Egyptian census data are the most comprehensive – the best we have, in fact, for any population before the fifteenth century. This material was catalogued and analysed by Bagnall and Frier in their seminal work *The Demography of Roman Egypt* (1994), which used demographic techniques of analysis and model life tables to argue that the population of this province adhered to the demographic patterns expected of all pre-modern Mediterranean populations.[15] This was the first study to offer a systematic and wide-ranging demographic investigation of an ancient population. It analysed data on birth, marriage and death with the aid of modern demographic methods, and has significantly informed our understanding of the impact of these on society, economy and culture.

In the last decade Scheidel has been a key figure in the study of Roman demography. He edited the collection of essays *Debating Roman Demography* (2001), which advocated the use of demographic theory and methods to explore population trends in the Roman world.[16] Scheidel highlights this approach as the most productive and sensible way forward for Roman demographic and population history: 'Proxy data, comparative evidence and theoretical models may be poor substitutes for reliable statistics. At the same time, they encourage a more holistic perspective, transcending facile categorisation and compartmentalisation. This cross-disciplinary embeddedness is the future for Roman demography.'[17] The papers in *Debating Roman Demography* demonstrate the value of such an

[14] Parkin, 1992.
[15] Bagnall and Frier, 1994, now updated, 2006. For some key demographic studies of Roman Egypt which make use of this material, see Bagnall *et al.*, 1997; Frier, 1994; Alston, 2001; Scheidel, 2001a; Tacoma, 2006. For the Ptolemaic period, see recently collated and published salt-tax registers and lists which can be used for demographic study: Clarysse and Thompson, 2006.
[16] Scheidel, 2001b. [17] Scheidel, 2001c: 81.

approach to a number of areas in Roman history: the seasonal birthing cycle of Roman women (Shaw); military recruitment and overpopulation in republican Italy (Lo Cascio); population size and structure in the Roman Empire (Frier); and the urban population of late Roman Egypt (Alston).

The kind of 'holistic perspective' and 'cross-disciplinary embeddedness' proposed by Scheidel were most recently adopted by de Ligt and Northwood in *People, Land, and Politics: Demographic Developments and the Transformation of Roman Italy, 300 BC – AD 14* (2008).[18] This edited collection presents a reconstruction of the demography of republican Italy, using demographic modelling alongside an analysis of census data and archaeological material, and explores the social, economic, military and political implications of demographic development in both urban and rural regions of Italy. The book's cross-disciplinary reconstruction challenges many of the traditional views of republican Italy's population and land development from the beginning of the third century BC onwards. The *Cambridge Economic History of the Greco-Roman World* (2007) also takes a holistic approach to the study of economy and demography, and seeks to identify and explain the relationship between the two.[19]

These studies have set the terms of debate for ancient historical demography: increasingly, ancient historians have engaged with this research, and have incorporated demographic methods and ideologies into more specialised areas of ancient history. Consequently, the discipline of ancient demography has advanced significantly over the past few decades, from studying not only population size, structure and growth, but also the relationships between these and particular areas of life in the ancient world. These areas include economic development, mobility and migration, military recruitment, political participation, and family and household organisation, each of which is addressed in the present volume.

Economic structures and development are, of course, heavily influenced by demographic change, and economies respond to, and are influenced by, fluctuations in population numbers.[20] The size and structure of a population affect the economy in various ways, impacting upon the distribution of resources, the availability of labour and overall living standards. On a macro level, the size of the population in relation to the available resources is crucial for estimating the relative prosperity or poverty of a population. Finite resources can be stretched to breaking point if a population increases

[18] De Ligt and Northwood, 2008. [19] Scheidel *et al.*, 2007.
[20] Scheidel, 2007a; Morley in this volume; Holleran in this volume. See also Scheidel, 2001c: 72–7, for discussion of the importance of demography on economy.

too rapidly or beyond its means (the so-called 'Malthusian trap'), and, conversely, falls in population numbers can result in increased living standards, since resources are shared between fewer people. Fluctuations in population numbers also affect the availability of labour and thus impact upon wage levels and living standards: an increase in population, for example, can result in a drop in wages due to the abundance of labour available, while a fall in population can have the opposite effect. The structure of a population – that is, both its sex and age distribution and its social structure – is also an important consideration, as this dictates the distribution of resources within that population. An overall increase in the economic output of a society, in modern terms its gross domestic product (GDP), might not necessarily indicate an overall increase in living standards. It could in fact reflect a growing inequality: a small number of the elite could become increasingly richer, while the majority of a population remained at subsistence level. For this reason, although detecting per capita growth rather than aggregate growth is preferable, even this can be a false indicator of the reality of an economy, as wealth is not necessarily shared equally.[21]

On a micro level the economic position of individuals necessarily impacts upon both their reproductive decision making and their life expectancy. The impact of demographic dynamics on the economy is one that is increasingly recognised by scholars of the ancient economy. Morley, for example, explored the economic effect of the population of Rome on the city's Italian hinterland; in a more recent contribution he also highlighted the connection between social structure, demography and the economy.[22] Jongman's recent work on consumption has argued that the economic prosperity of the Roman Empire did spread beyond the elite, raising living standards for relatively large segments of the population, at least in the late republic and early empire.[23] Much of Scheidel's recent work on Roman economic growth also considers the size and structure of the population to be a central factor in models of the Roman economy.[24] Mobility and migration of populations also have a significant impact upon an economy.

[21] Aggregate growth could merely represent an increase in population, whereas per capita growth reflects growth per person and thus enables a rise in living standards for all, provided that the benefits of economic growth are shared equally across a population. For the importance of specifying the type of growth discussed, see Millet, 2001; Saller, 2002.

[22] Morley, 1996; Morley, 2006b. [23] Jongman, 2007.

[24] Scheidel, 2008a, 2009a, in press a; Scheidel and Friesen, 2009. Scheidel, 2004b, on the mobility of the free population; 2005, on mobility of the servile population.

Patterns of military recruitment, and the demographic dynamics of the populations from which recruits were drawn, also impact upon social and economic history. Scheidel's case study of the recruitment of legions in the Roman Empire, for example, illustrates the sheer scale of the influence of the army on men and women in Roman populations 'from cradle to grave'.[25] Rosenstein uses demographic modelling to illustrate that such an impact on the families of rural Italy in the late republic was, while wide scale, plausible.[26] Understanding movement to and from ancient cities is also central to our understanding of ancient urbanism: we can paint a much clearer picture of the infrastructure of cities if we have some level of understanding of the size and social composition of its population, and movements into and out of that population.[27] Similarly, levels of political participation are subject to the structures and movements of populations, as demonstrated clearly by Hansen, who has used data from the Greek world in conjunction with model life tables to investigate political participation in Athens and Attica.[28]

At a more domestic level, family and household organisation also respond to demographic change, and are therefore central to a population's reproductive and economic behaviour. Fertility rates and changes in them are often reflective of cultural attitudes towards childbearing, birth spacing, and family and household organisation. Seminal studies on the structures of the ancient family, such as those by Saller and Shaw or Kertzer and Saller, have focused primarily on the static structures of 'nuclear' and 'non-nuclear' families.[29] Studies of fertility and mortality in rural Italy and in Egypt have sought to relate reproductive decision making to such demographic circumstances and also to household economics; biological, environmental and cultural determinants of fertility are important factors to consider in the study of the life course of the family.[30]

[25] Scheidel, 1996.
[26] Rosenstein, 2004. See also De Ligt and Northwood, 2008, and Fischer-Bovet in this volume.
[27] Morley, 1996; Alston, 2001; Holleran in this volume.
[28] Hansen,1985, 2006a, 2006b; Akrigg in this volume; Taylor in this volume.
[29] Saller and Shaw, 1984; Kertzer and Saller, 1991. Cf. Bagnall and Frier, 1994, 2006.
[30] On demography and family and household in the ancient world, see Saller, 1994, 2007; Alston, 2005; Scheidel, 2007b; Hübner, 2010; Pudsey in this volume. On birthing cycles, see Shaw, 2001. On reproductive decision making, see Frier, 1994, and Hin, in this volume. On house sharing and domestic space, see Alston, 1997. On fatherlessness in antiquity, see Hübner and Ratzan, 2009.

THE BOOK

As this survey of the historiography demonstrates, the importance of demography to ancient history is wide-ranging. This book applies demographic thinking to a set of ancient historical problems, providing a series of case studies which demonstrate the central role played by population in ancient societies and economies. The first two chapters discuss the development of demographic analysis in ancient history, placing the subsequent papers in context. Morley begins by detailing the development of ideas about the relationship between demography and development in classical antiquity, discussing the debate from its origins with Hume and Malthus to modern development economics. Taking as a case study the familiar debate concerning the population of Italy in the late republic, he draws on demographic theory and demonstrates that the debate about absolute population levels in Italy at the time of Augustus is irrelevant to the study of the relationship between demography and development; the range of economic possibilities that accompany any population estimate is too wide to enable any useful conclusions to be reached. He argues instead that we should consider the dynamics of population change, for example the impact of military recruitment, migration and colonisation on the economic structure and development of Roman Italy.

Akrigg's paper complements and builds upon this, exploring the issues raised by Morley in relation to Greek demography, but this time using Athens as a case study. He argues that the full importance of a demographic approach has not yet been appreciated in Athenian history: many Greek historians view demography as a minor field, and the focus of demographic investigations of Athens has been restricted to a narrow conception of the political implications of the population. While Hansen's work is of obvious importance here, Akrigg argues that its dominance has reinforced this trend. Instead, he makes the point that thinking seriously about Athenian demography can tell us much more than the extent of political participation, or the extent of Athenian dependence on imported food.[31] He emphasises the wider relevance of demography to all aspects of Athenian history, demonstrating that the importance of demography should be appreciated by everyone with an interest in Athens and ancient Greece.

The following two papers are concerned with fertility and the family. In her chapter Pudsey considers nuptiality, one of the most important aspects of fertility: she explores the influence of marriage patterns on the family's

[31] Hansen, 1985, 2006a, 2006b; Moreno, 2007.

demographic life cycle, with reference to recorded households in Roman Egypt. The chapter presents a case for the study of the family in Roman Egypt as an example of variety in family formation, particularly between social classes and urban and rural populations, and illustrates this with data on the family life cycle from the perspective of an important transition point – that is, when sons choose to marry. The chapter demonstrates that historical models of marriage patterns and family formation have overestimated the explanatory value of regionally specific patterns of behaviour; it illustrates that pre-modern fertility schedules and family formation are not just regionally but also socio-economically specific.

Hin's paper tackles theories of fertility behaviour during the late Roman republic. She challenges the processes and interactions underlying fertility behaviour as put forward by Brunt in his influential *Italian Manpower*.[32] Brunt argued that it was not just mortality that curbed demographic growth among Roman citizens of the late Roman republic, but a rational choice to limit fertility, driven by economic considerations. Hin takes full account of wider developments in the field of demography, drawing upon criticism of traditional rational choice theory, perspectives from the fields of cultural anthropology and human evolutionary ecology, and comparative material from other pre-modern populations. She argues that any decrease in the rural Italian population in the late republic was ultimately driven by excess mortality rather than declining fertility.

The three papers relating to migration, Taylor, Fischer-Bovet, and Holleran, are concerned with population movements and their implications for social and political life, military recruitment and economies, respectively. These chapters consider the influences of migration on three different populations, namely those of Attica, Ptolemaic Egypt and Rome, and together demonstrate the varied ways in which populations behave within different socio-economic, environmental and cultural contexts. Taylor, for example, considers migration within Attica, emphasising the 'circular' and 'non-permanent' nature of much of this population movement. She explores the motivation for moving and the effect of migration both on the place of origin and the receiving settlement. By taking a primarily qualitative approach, she demonstrates that it is possible to assess the involvement of the demes in the political life of Athens, the impact of migration on deme communities, and the relationship between demographic change and local social and political identity. Taylor demonstrates that significant advances can be made by analysing the demography of

[32] Brunt, 1971.

Attica in this way, in terms of understanding not only the impact of demographic factors on Athenian society but also their impact on Athenian political life.

Fischer-Bovet investigates Greeks' migration to and mobility in Ptolemaic Egypt in the third century BC. She employs new calculations to challenge the assessments of immigration previously proposed – that is, that approximately 10 per cent of the population were Greeks. Using estimates drawn from ancient data, together with a mathematical model of the number of adult Greek males living in the Fayyum, she suggests a more irregular and much lower flow of immigration (*c.*5 per cent) than previously supposed. She argues that these demographic revisions should be taken into account when analysing the Ptolemaic state, particularly the socio-economic and cultural interactions between the different groups of population, most notable of which are military settlers.

Holleran in her paper is also concerned with the movement of populations, and in it explores the critical relationship between migration and the urban economy of Rome. She considers the motivation of those who migrated to Rome, and then focuses on the economic effect of this population movement. Drawing upon a combination of ancient evidence, theoretical models and comparative material from contemporary cities in the developing world, she argues that the particular social and institutional framework of Rome limited the economic opportunities for new migrants, both temporary and permanent. Despite claims that poverty was always conjunctural for the able-bodied in Rome,[33] Holleran contends that many migrants faced absolute structural poverty and the ever-present threat of destitution. The implications of this view of the urban economy are explored, and the importance of population to our understanding of the city of Rome is thereby demonstrated.

Parkin offers some closing remarks which review the state of the subject of ancient historical demography since the publication of his *Demography and Roman Society* in 1992, and reconsider the structure of his book in relation to the papers in the present volume. He reflects on the methodological approaches and the advances made in the papers, and comments positively both on the centrality of demographic studies to ancient social and economic history, and on the future of research in ancient demography.

In considering the effects of demographic behaviour on ancient societies and economies, the papers demonstrate the importance of population dynamics in the ancient world. Our populations are shown to be

[33] For example, Grey and Parkin, 2003: 287; Osborne, 2006: 5.