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British Economic Growth, 1270–1870

This is a definitive new account of Britain's economic evolution from a backwater of Europe in 1270 to the hub of the global economy in 1870. A team of leading economic historians reconstruct Britain's national accounts for the first time right back into the thirteenth century to show what really happened quantitatively during the centuries leading up to the Industrial Revolution. Contrary to traditional views of the earlier period as one of Malthusian stagnation, they reveal how the transition to modern economic growth built on the earlier foundations of a persistent upward trend in GDP per capita which doubled between 1270 and 1700. Featuring comprehensive estimates of population, land use, agricultural production, industrial and service-sector production and GDP per capita, as well as analysis of their implications, this will be an essential reference for anyone interested in British economic history and the origins of modern economic growth more generally.

STEPHEN BROADBERRY is Professor of Economic History at the London School of Economics, Research Theme Leader at CAGE and Director of the Economic History Programme at CEPR.

BRUCE M. S. CAMPBELL is Emeritus Professor of Medieval Economic History at the Queen's University of Belfast.

ALEXANDER KLEIN is an Assistant Professor at the School of Economics, University of Kent.

MARK OVERTON is Professor of Economic and Social History at the University of Exeter.

BAS VAN LEEUWEN is a postdoc researcher in economic history at Utrecht University.

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STEPHEN BROADBERRY
London School of Economics

BRUCE M. S. CAMPBELL
The Queen's University of Belfast

ALEXANDER KLEIN
University of Kent

MARK OVERTON
University of Exeter

and

BAS VAN LEEUWEN
Utrecht University

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Preface and acknowledgements

Publication in 1962 of Phyllis Deane and Max Cole's *British economic growth, 1688–1959* marked a watershed in historical analysis of economic growth. Simon Kuznets and his colleagues at the National Bureau of Economic Research had already applied the relatively new techniques of national income accounting to the measurement of economic growth since the late nineteenth century, when the modern statistical age effectively began. Deane and Cole's innovation was to extend national accounting methods to investigation of a period spanning 272 years and beginning long before statistical agencies produced long time-series of data on consistently defined variables. To achieve this they assembled their own datasets, made ingenious use of proxy measures when direct evidence was lacking, and modelled what was missing altogether. Their book is a mine of information and a model of clarity and logic.

It is fair to say that this new approach to economic history before the mid-nineteenth century was not welcomed by all economic historians, and some reviewers focused their attention on the shortcomings of the data series constructed by Deane and Cole, which they saw as undermining the credibility of the conclusions being drawn about the processes of British economic development. Other economic historians, inspired by Deane and Cole's novel approach but sceptical of the authors' findings, responded by refining and extending the available datasets, seeking better ways of combining them into robust estimates of national income, and ensuring that all assumptions made were empirically well grounded. After 50 years of work in this vein, Deane and Cole's basic analysis has been fairly comprehensively revised and understanding of the processes of economic growth during the world's first industrial revolution has been elevated to a new plane.

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Among the most important revisions is that of Nicholas Crafts and Knick Harley, who argue that the rate of economic growth during the period 1700–1830 was much slower than Deane and Cole had suggested and, by implication, that Britain was altogether richer and more developed on the eve of the industrial revolution than had previously been thought. That finding raises an important challenge for economic historians who wish to understand fully the processes by which a poor agrarian country off the coast of mainland Europe made the transition to become the workshop of the world. In particular, it invites further extension of historical national income analysis back in time as far as available data sources permit, which means notionally as far back as the remarkable Domesday Survey of 1086. This book is a response to that challenge. Like Deane and Cole before us, we both hope and expect that the data assembled, methods employed, assumptions made and estimates derived will prompt debate and provoke and stimulate others to undertake more work and in due course come up with a more robust set of results.

It is the historian's inevitable regret that had more time and resources been available more archives might have been searched and extra data collected and processed. Nevertheless, sufficient data have already been gathered by generations of scholars to facilitate this preliminary attempt at describing quantitatively what happened in Britain during the centuries leading up to, as well as during, the industrial revolution. Government income and expenditure are recorded from the twelfth century, price series extend back to the late twelfth century, wage series to the first half of the thirteenth century, annual customs statistics of dutiable exports begin in the 1270s and good runs of farm-level agricultural output data at about the same time. Tin output is known from the early fourteenth century, there are estimates of iron output from the fifteenth century and coal production from the late sixteenth century, and library catalogues capture publication of printed books from William Caxton's first printing in 1476 of Chaucer's *Canterbury tales*. England's demographic history has been reconstructed in detail back to 1541 and more tentatively back to 1086,

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and thanks to the curiosity of William I, Gregory King, Joseph Massie and Patrick Colquhoun there are social tables for 1086, 1688, 1759 and 1801/03. Many gaps remain, not least because some topics and archives have attracted far more historical attention than others, but enough material is now available to justify the current enterprise.

We are by no means the first to be tempted to fashion national income estimates from this substantial body of evidence. Historians have long been engaged in advancing estimates for individual components of the national economy – population, urbanisation, land use, kilocalorie food output and much else – and a few have taken the additional step and assembled these into estimates of GDP. Some of these earlier attempts at national income estimation merely focus upon individual benchmark years, others either lack transparency in their methods and assumptions or rely too heavily on real-wage-rates. They have nevertheless emboldened us to try and come up with a better set of results that avoid these shortcomings. In Part I of this book, 'Measuring economic growth', established methods of national accounting are applied on an annual basis to data spanning the 600 years from 1270 to 1870, with the 170 years from 1700 overlapping the estimates of Crafts and Harley (and, before them, Deane and Cole). Results obtained for the period after 1700 therefore serve as a cross-check of our method. Further, an input–output table for 1841 reconstructed by Sara Horrell, Jane Humphries and Martin Weale likewise provides the anchor point for calibrating these results. These are constructed from the output side and built up sector by sector, taking full account of inconsistencies in spatial and chronological coverage, before being combined into a single weighted estimate of national economic output which, when divided by the estimates of national population, yields GDP per head. These estimates naturally make extensive use of information on prices and wages and are informed by urbanisation ratios, but are not overly dependent upon them. In fact, the results highlight several striking divergences between GDP per head and the real-wage-rates of agricultural and building labourers and building craftsmen.

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Because results of this level of generality should not be taken on trust, much space is devoted in Part I to documenting sources, describing methods and setting out the assumptions that generate the component estimates of population, agricultural output, industrial output and service sector output, which then combine together into overall estimates of GDP and GDP per head. Within the allowance of space available to us, we have endeavoured to be explicit about what we have done so that others may improve upon it. Part II of the book then offers a critical reflection on these estimates of GDP, population and GDP per head and explores some of their implications. These include the alternative chronology of real-wage-rates, levels and patterns of food and non-food consumption, income inequality and the changing social distribution of wealth, the productivity of labour and Britain's growth performance relative to that of other countries in both Europe and Asia. Effectively, therefore, the second part offers a fresh perspective on the broad sweep of British economic history from the high middle ages to the late nineteenth century. As far as possible conventional historiographic periodisations are ignored so that the chronological continuities and discontinuities that emerge are those intrinsic to the evidence.

Whatever shortcomings these estimates undoubtedly have, they have one redeeming merit: they are internally consistent, insofar as the component estimates of population, sectoral output and total output really fit together. Here it is helpful to draw an analogy with the construction of a table, where it is crucially important that the four legs are all of the same length, of an appropriate height and ideally of matching materials and design. This will not result if the legs are made independently of each other. Our national income table does not have this fault, since its four legs of population, agricultural output, industrial output and service-sector output have all been fashioned according to an overarching national accounting template. At various points in this book, attention is drawn to alternative estimates for particular parts of the economy which are difficult to reconcile with each other. Identifying and eliminating these types of mismatch are one way of

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reducing the margins of error by which all historical output estimates are inevitably bounded. Moreover, since all component elements of a national economy are interrelated, a change in the value of any one variable must necessarily entail adjustments to all the others. Changes to some values make little difference; alterations to a few have potentially big repercussions. For instance, any change in the estimated area under arable cultivation affects the dependent estimates of agricultural output and kilocalorie food output and, thus, the size of the population that could potentially be fed. Likewise, the size of the national sheep flock bears upon the value of agricultural output, export earnings, national wool-textile production and the kilocalorie supply of mutton. Getting all the estimates in this study to align with each other has been one of the greatest challenges of the undertaking, but also one of the most satisfying.

This project has its origins in a session at the 14th World Economic History Congress held in Helsinki in 2006. The session, on 'Progress, stasis, and crisis: demographic and economic developments in England and beyond AD *c*.1000–*c*.1800', contained papers by Bruce Campbell and Mark Overton on England's long-run agricultural productivity performance and by Stephen Broadberry and Bishnupriya Gupta on long-run real-wage developments in Europe and Asia. During the conference, Broadberry, Campbell and Overton discussed the feasibility of reconstructing British national income over the late-medieval, early modern and modern periods and continued to advance these plans when they met at the annual conference of the Economic History Society. Others interested in the quantification of long-run economic development also attended these meetings, including Jan-Luiten van Zanden, who was developing a similar project for Holland.

During 2007, with funding provided by the European Commission's Research Training Network 'Unifying the European experience: historical lessons of pan-European development' (FP6–512439), Broadberry hired two of Zanden's recent doctoral students, Bas van Leeuwen and Peter Földvari, to work for six months as postdoctoral researchers at the University of Warwick. During this period a feasibility study

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was undertaken and then a grant application written, bringing together the proposed British and Dutch projects. This culminated in the award of a Leverhulme Trust grant for the period 2007–2010 for the project 'Reconstructing the national incomes of Britain and Holland, *c*.1270/1500 to 1800' (Reference Number F/00215AR). With this funding two postdoctoral researchers were hired. Bas van Leeuwen joined the project immediately and remained a vital part of the team throughout, from the feasibility study in 2007 to delivery of the final manuscript in 2014. The second research position was initially filled by Alexander Apostolides, but in 2008, after his early withdrawal from the project, Alexander Klein took over and he, too, remained with the team until delivery of the final manuscript. The project's work was further enhanced when Broadberry, in collaboration with Kevin O'Rourke, secured additional funding via the European Commission's 7th Framework Programme for Research (Contract Number SSH7-CT-2008–225342), for the project 'Historical patterns of development' (HI-POD). This brought together researchers working on historical national accounting for other economies in Europe and beyond, thus broadening significantly the international comparative aspects of the British and Dutch project.

From the outset the project had available to it the two major agricultural datasets assembled by Campbell from manorial accounts for the late-medieval period, and by Overton from probate inventories for the early modern period. Without these datasets the agricultural output estimates presented in Chapter 3 could not have been constructed. Each was put together over many years with funding assistance from a number of bodies. Campbell's work on the manorial accounts database was begun in 1983–4 during tenure of a Personal Research Fellowship from the Economic and Social Research Council (ESRC). Additional data for ten counties around London were collected as part of the two 'Feeding the City' projects funded between 1988 and 1994 by the Leverhulme Trust and ESRC and undertaken in collaboration with Derek Keene, Jim Galloway and Margaret Murphy. In 2005–7 further funding was obtained from the ESRC for the project

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'Crops yields, environmental conditions, and historical change, 1270–1430' (RES-000–23-0645). It allowed more data to be gathered, including those relating to the estates of the bishops of Winchester and Westminster Abbey extracted from the original rolls by Jan Titow and David Farmer and now deposited with their respective papers at the Hampshire Record Office and University of Saskatchewan Archives. Thanks are due to Dr Titow for permission to use his materials, to the staff of both archives for expediting this task and to David Hardy for visiting Saskatoon and making scanned copies of Professor Farmer's notes. In 2005 a British Academy small grant financed work on the rich archive of Canterbury Cathedral Priory, where Marilyn Livingstone helped with transcription, and the next year a Margery Grant from the Sussex Archaeological Society paid for Christopher Whittick and Anne Drewery to undertake similar work on major runs of accounts relating to manors belonging to Battle Abbey and Glastonbury Abbey. Much of this material was input to a database by staff of the Centre for Data Digitisation and Analysis at The Queen's University of Belfast, under the expert supervision of Elaine Yates. Further information on these archives and the manors included in the database, together with all the crop yield calculations, is available on the website: B. M. S. Campbell (2007), *Three centuries of English crop yields, 1211–1491* (www.cropyields.ac.uk). Hard-copy transcriptions of most of this material are also now on deposit at the Public Record Office of Northern Ireland.

Mark Overton began collecting probate inventories during work for his doctoral thesis on Norfolk and Suffolk which was funded by the Social Science Research Council from 1972 to 1974. These were augmented by a further sample from Hertfordshire, Lincolnshire, Worcestershire and County Durham collected by Bridget Taylor, Linda Crust, Brenda Webster, Meemee Wong and Joanna Laidlaw during 1987–9 as part of an ESRC-funded project on 'Prices from probate inventories in England, 1550–1750' (B00232211). The Leverhulme Trust funded a two-year project during 1996–8 on 'Household economies in southern England, 1600–1850' during which the inventories

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from Kent and Cornwall were transcribed by Darron Dean and Andrew Hann and further Kent inventories were collected by Darron Dean during an ESRC-funded project on 'Contextualising consumption: a study of Kentish households 1600–1750' (R000222733). Much of the software for manipulating inventories was developed during Mark Overton's Visiting Fellowship at All Souls College Oxford in 1992–3, but considerably refined by Mark Allen during the Leverhulme project in 1996–7.

In addition to these agricultural datasets, Larry Poos gave access to materials he had gathered on local population counts from manorial tenancy and tithing sources, while Leigh Shaw-Taylor and Tony Wrigley provided us with their data on the occupational structure of England and Wales, which is indispensable for the analyses of sectoral labour productivity in Chapter 9. Many other scholars within the wider economic history research community have given generously of their advice and encouragement and allowed us access to unpublished data. Here, specific thanks are due to the late Richard Britnell, Nick Crafts, Ben Dodds, Martin Ecclestone, John Hatcher, Leigh Shaw-Taylor, Philip Slavin, Richard Smith, Jan de Vries and Tony Wrigley. We have also received useful feedback during seminar and conference presentations at Bocconi, Cambridge, Durham, Evanston, LSE, Reading, Tokyo, Utrecht, Venice, Warwick and Yale. Finally, comments from two anonymous readers of the original proposal for this volume have been helpful in preparing the final text and Michael Watson and the production team at Cambridge University Press have done a sterling job at getting a complex manuscript into print.

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Weights, measures and money

Imperial measures and their metric equivalents

Length		
1 mile (ml.)	= 1,760 yards	= 1.6093 kilometres
Area		
1 acre (ac.)	= 4,840 square yards	= 0.4047 hectare (ha)
1 square mile (ml.^{2})	= 259 hectares	= 2.590 square kilometres
Liquid volume		
1 pint		= 0.5683 litres
1 gallon	= 8 pints	= 4.546 litres
Dry volume		
1 bushel (bus.)	= 8 gallons	= 35.238 litres
1 quarter (qtr)	= 8 bushels	= 281.904 litres
		= 2.819 hectolitres
Volume by area (a measure of yield)		
1 bushel per acre (bus./ac.)	= 86.072 litres per ha	= 0.8607 hectolitres per ha
1.1485 bushels per acre (bus./ac.)		= 1 hl. per ha
Weight (based on the pound avoirdupois)		
1 pound (lb.)	= 16 ounces	= 0.4536 kilograms
1 stone	= 14 lbs	= 6.3504 kilograms
1 quarter (qtr)	= 2 stone	= 12.7008 kilograms
1 hundredweight (cwt)	= 4 qtrs	= 50.8032 kilograms
1 ton	= 20 cwts	= 1.016 tonne
Money		
1 penny (d.)		
1 shilling (s.)	= 12d.	
1 pound (£)	= 20s.	= 240d.

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